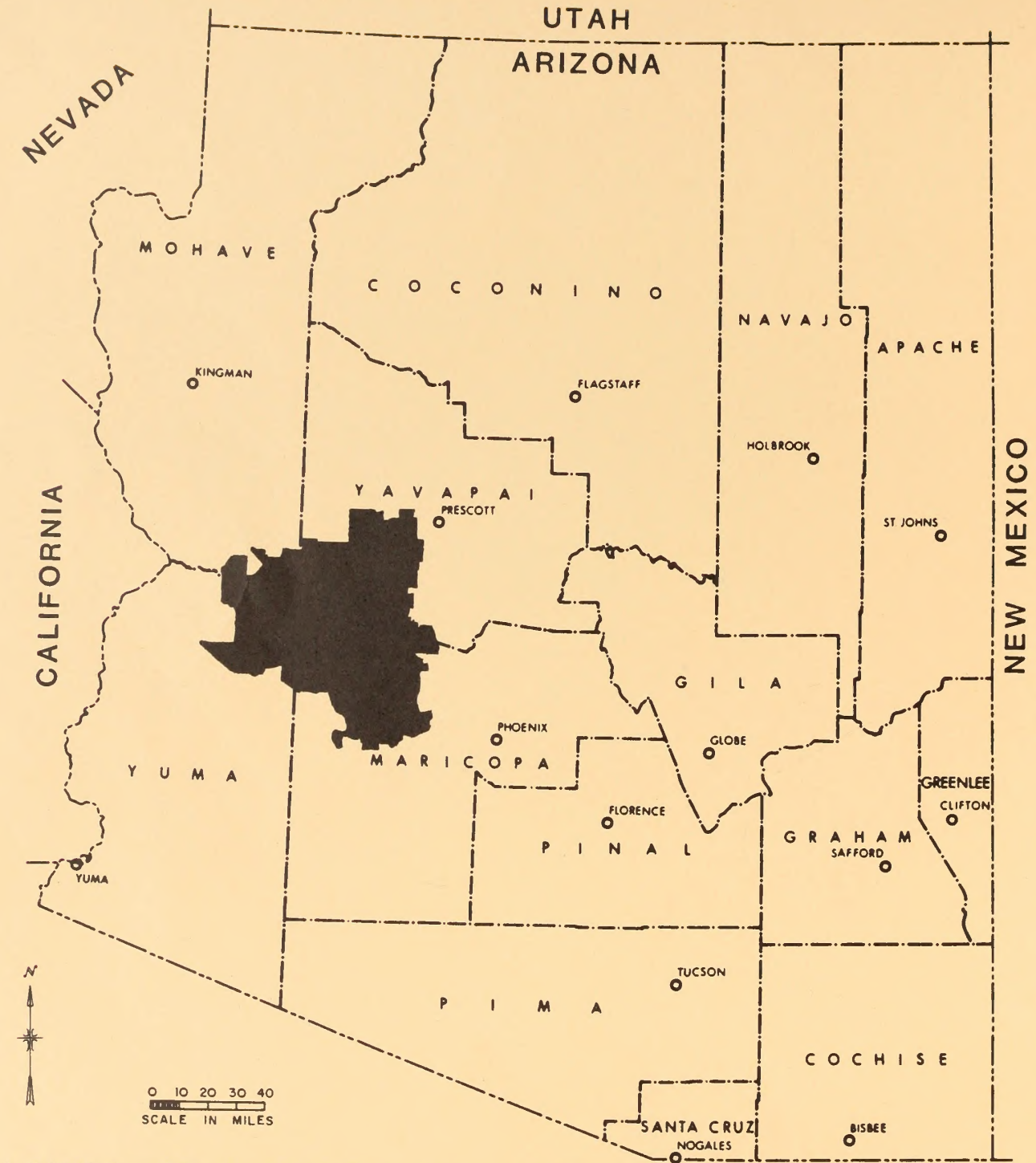
LOWER GILA NORTH

Draft Grazing Environmental Impact Statement

Prepared by
U.S. Department of the Interior
Bureau of Land Management
Arizona



LOWER GILA NORTH EIS AREA

LOCATION MAP

AREA BOUNDARY

IN REPLY REFER TO

United States Department of the Interior

BUREAU OF LAND MANAGEMENT

PHOENIX DISTRICT OFFICE
2929 WEST CLARENDON AVENUE
PHOENIX, ARIZONA 85017

March 19, 1982

Dear Reviewer:

Two public hearings have been scheduled to receive oral and written testimony on this draft environmental impact statement. The hearings will take place at 7:30 p.m. in Wickenburg and Phoenix, Arizona at the following locations:

May 4, 1982	May 5, 1982
Community Center 160 N. Valentine Wickenburg, Arizona	Rodeway Inn Metrocenter 10402 N. Black Canyon Highway Orchard Room 3 Phoenix, Arizona

Oral testimony will be limited to 10 minutes. Those wanting to testify should send the attached request to the District Manager, Bureau of Land Management, Phoenix District Office, 2929 W. Clarendon Avenue, Phoenix, Arizona 85017. Witnesses should direct their testimony to the contents of the document and to specific aspects of the grazing management proposal or its alternatives. Written testimony may be submitted at the hearing or mailed to the Phoenix District Manager.

A 60-day comment period on this draft environmental impact statement will begin when the draft is filed with the Environmental Protection Agency. This comment period will end on May 21, 1982. Comments received after the 60-day review period will be considered in the later decisionmaking process, even though they may be too late to be included in the final environmental impact statement.

W. K. Barker
District Manager

PUBLIC HEARINGS REGISTRATION FORM

For public hearings on the draft Lower Gila North Environmental Impact Statement.

(PLEASE PRINT)

To: Bureau of Land Management, Phoenix District Office, Lower Gila North Grazing EIS, 2929 W. Clarendon, Phoenix, Arizona 85302.

From: Name _____

Address _____

City, State _____ Zip Code _____

Representing _____

I wish to speak at the public hearing on May _____, 1982, to express my views.

I intend to submit written documentation: Yes _____ No _____

_____
Signature

Oral testimony will be limited to 10 minutes; written testimony will be accepted at the above address until close of business on May 21, 1982. Registration forms are to be submitted to the Phoenix District Office before the close of business on May 3, 1982.

IN REPLY REFER TO

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
ARIZONA STATE OFFICE
2400 VALLEY BANK CENTER
PHOENIX, ARIZONA 85073

March 1982

Enclosed for your review and comment is the draft environmental impact statement for the proposed grazing management program for the Lower Gila North Planning Area in Yuma, Mohave, Yavapai, and Maricopa Counties, Arizona.

The environmental impact statement is based on information from Bureau of Land Management planning ducuments, inventory records, and other sources including federal, state, and local agencies, private organizations, and interested individuals. The purpose of the statement is to disclose in advance the probable environmental impacts of the proposed action and its alternatives, and to assure that these factors are considered along with economic, technical, and other considerations in the decisionmaking process.

We would appreciate receiving your comments on the draft statement. The comment period will run for 60 days after the draft is filed with the Environmental Protection Agency and the notice of receipt is published in the Federal Register. The notice is anticipated in March 1982. Public hearings will be held in Phoenix and Wickenburg, Arizona, details of which will be advertised. Comments received after the 60-day review period will be considered in the subsequent decision process, even though they may be too late for inclusion in the final environmental impact statement.

Your comments should be sent to:

District Manager
Bureau of Land Management
Phoenix District Office
2929 W. Clarendon Avenue
Phoenix, Arizona 85017

Sincerely,

Tom Allen

Acting State Director

DRAFT
ENVIRONMENTAL IMPACT STATEMENT

PROPOSED GRAZING MANAGEMENT PROGRAM

for the

LOWER GILA NORTH EIS AREA

YUMA, MOHAVE, YAVAPAI, AND MARICOPA COUNTIES, ARIZONA

Prepared by

DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
PHOENIX DISTRICT

Acting State Director
Arizona State Office

The Bureau of Land Management proposes to implement a grazing management program within portions of the Lower Gila North Planning Area. The program would allocate vegetation to livestock, big game, and wild burros. The proposal recommends levels of livestock grazing management, identifies needed rangeland developments, and outlines a schedule of implementation. Measures to protect or enhance environmental resources have been incorporated into the program. Alternatives considered in addition to the *Proposed Action* include *Continuation of Present Grazing Management, Intensive Grazing Management, Seasonal Grazing Management,* and *Elimination of Livestock Grazing.* A concise description of the affected environment and an analysis of the environmental consequences resulting from the proposed action and each alternative are included in the document.

For Further Information Contact: Bill Carter, EIS Team Leader, Phoenix District,
Bureau of Land Management, 2929 W. Clarendon Avenue, Phoenix, Arizona 85017
or call (602) 241-2852.

Comments on the Draft EIS are due: MAY 21 1982

NOTICE TO READERS

Please keep this draft EIS for possible use as part of the final EIS. Council on Environmental Quality regulations [43 CFR 1503.4(c)] provide for circulation of abbreviated final EISs where major changes to the draft are not required. If the public review requires only minor changes to the draft, then the final EIS will consist of this draft and a supplement containing public comments, responses to comments, and necessary changes and corrections. This procedure will cut printing costs and speed up the environmental process.

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LIST OF PREPARERS

Name	Position	EIS Assignment	Education	Experience
James D. Crisp	Team Leader	Chapters 1, 2, and 4; Team Supervision	B.A. Geology, Brown University; M.A. Public Admin., Central Michigan	7 years BLM
Herbert K. McGinty	Writer-Editor	EIS Coordination and Editorial Review	B.A. History, Duke University M.A. Geography, Clark University; Certificate of Accomplishment in Editorial Practices, Department of Agriculture Graduate School	5-1/2 years BLM 3-1/2 years U.S. Geological Survey
Hector B. Abrego	Range Conservationist - Assistant Team Leader	Vegetation - Chapters 2, 3, and 4	B.S. Range Science, Texas A&M University	4 years BLM 3 years Private Ranching
Ted Cordery	Wildlife Biologist	Wildlife - Chapters 2, 3, and 4	B.S. Wildlife Management (Range Management Emphasis), Humboldt State University	6-1/2 years BLM
Russell M. Miller	Range Conservationist	Livestock Grazing - Chapters 2, 3, and 4	B.S. Natural Resource Management, Arizona State University	4 years BLM
Glenn F. Martin	Natural Resource Specialist	Wild Burros - Chapters 3 and 4	B.S. Forestry (Range Management), University of Idaho	20 years BLM
Tom Craft	Soil Scientist	Soils - Chapters 3 and 4	B.S. Soils and Agronomy, Oklahoma State University; Post Graduate Work - Soils, Iowa State University	5 years BLM 14 years SCS 10 years Private Ranching
Daniel McGlothlin	Hydrologist	Water Resources - Chapters 3 and 4	B.S. Watershed Hydrology, University of Arizona	1 year BLM 2 years Private Consulting
Hank Molz	Outdoor Recreation Planner	Recreation, Wilderness, Visual Resources - Chapters 3 and 4	B.S. Forestry, Northern Arizona University	11-1/2 years BLM 2 years Arizona State Parks
Catherine Bayer	Archaeologist	Cultural Resources - Chapters 3 and 4	B.A. Anthropology, Cal. State College, Stanislaus	3 years BLM
Tim L. Sanders	Regional Economist	Economic Conditions - Chapters 3 and 4	B.S. Wildlife Biology, M.S. Agricultural Economics, New Mexico State University	2-1/2 years BLM
Keith Pearson	Social Analyst	Social Attitudes - Chapters 3 and 4	B.A. History, Augustana College; M.A., Ph.D. Anthropolgy, University of Arizona	7 years BLM
William K. Carter	Environmental Coordinator	Technical Coordination and Review	B.S. Agronomy, Kansas State University	16 years BLM 1/2 year SCS
Julian Anderson	Range Conservationist	Technical Coordination and Review	B.S. Range Management, Utah State University	17 years BLM
Pamela A. Usowski	Range Technician	Data Assembly	B.S. Biological Agriculture, Arizona State University	2-1/2 years BLM
Karen Daniels	Clerk Typist	Word Processor Operation and Technical Coordination	Idaho State University	2 years BLM 1 year Forest Service

LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS TO WHOM COPIES OF THE STATEMENT ARE SENT

BLM will request comments on the draft EIS from all affected grazing permittees, interested individuals, and the following agencies and interest groups:

Federal Agencies

Advisory Council on Historic Preservation
Environmental Protection Agency
Department of Agriculture
  Agricultural Stabilization and Conservation Service
  Economic Research Service
  Forest Service
  Science and Education Administration
Soil Conservation Service
Department of Defense
  Corps of Engineers
Department of the Interior
  Bureau of Indian Affairs
  Bureau of Reclamation
  Fish and Wildlife Service
  Geological Survey
  National Park Service

Arizona State Agencies

Arizona Commission of Agriculture and Horticulture
Arizona Department of Health Services
Arizona Department of Library, Archives, and Public Records
Arizona Department of Transportation
Arizona Game and Fish Department
Arizona Natural Heritage Program
Arizona Office of Economic Planning and Development
Arizona Outdoor Recreation Coordinating Commission
Arizona State Clearinghouse
Arizona State Historic Preservation Officer
Arizona State Land Commissioner
Arizona State Parks Board
Arizona State University
Arizona Water Resources Department
Attorney General's Office
Governor Bruce Babbitt
Governor's Commission on Arizona Environment
Museum of Northern Arizona
Northern Arizona University
University of Arizona

Local Agencies

Big Sandy Natural Resources Conservation District
Buckeye-Roosevelt Natural Resource Conservation District
District IV Council of Governments
Maricopa Association of Governments
Maricopa County Board of Supervisors
Maricopa County Extension Service
Maricopa County Planning and Zoning Commission
Mohave County Board of Supervisors
Mohave County Community College
Mohave County Extension Service
Mohave County Library
Mohave County Planning and Zoning Commission
Northern Arizona Council of Governments
Phoenix Public Library
Wickenburg Resource Conservation District
Yavapai College
Yavapai County Board of Supervisors
Yavapai County Extension Service
Yavapai County Planning and Zoning Department
Yuma County Board of Supervisors
Yuma County Extension Service
Yuma County Planning and Zoning Department

Other Organizations

Arizona Cattle Growers Association
Arizona Desert Bighorn Sheep Society
Arizona Farm Bureau Federation
Arizona Fund for Animals
Arizona Livestock Production Credit Association
Arizona Wildlife Federation
Arizona Wool Growers Association
Arizona 4-Wheel Drive Association
Defenders of Wildlife
Desert Donkey and Mule Club
Desert Tortoise Council
Federal Land Bank Association
Grand Canyon Chapter, Sierra Club
Humane Society
International Society for the Protection of Mustangs and Burros
Izaak Walton League of America
League of Women Voters
Maricopa County Farm Bureau Federation
Multiple-Use Advisory Council, Phoenix District
National Audubon Society
National Council of Public Land Users
Natural Resources Defense Council, Inc.
Newspapers
Phoenix-Lower Gila Resource Areas Grazing Advisory Board
Public Lands Council
Public Lands Institute
Save the Mustangs
Society for Range Management
The Maricopa Audubon Society
Wild Burro Protection Association
Wilderness Society
Wild Horse Organized Assistance
Wildlife Management Institute
Wildlife Society
Yavapai County Cattle Growers
Yuma County Farm Bureau Federation

Elected Representatives

Federal
  Representative John J. Rhodes
  Representative Eldon Rudd
  Representative Bob Stump
  Representative Morris K. Udall
  Senator Dennis DeConcini
  Senator Barry Goldwater
State
  Representative Pete Corpstein
  Representative Bob Denny
  Representative Jerry Everall
  Representative John U. Hays
  Representative Cal Holman
  Representative Bill Lewis
  Representative James B. Ratliff
  Senator John C. Pritzlaff, Jr.
  Senator S. H. "Hal" Runyan
  Senator Boyd Tenney

SUMMARY

SUMMARY

Purpose and Need

The Bureau of Land Management (BLM) proposes to implement a grazing management program for the Lower Gila North Planning Area in Maricopa, Yuma, Yavapai, and Mohave Counties, Arizona. The area encompasses 1,393,000 acres of public land, 847,000 acres of state land, and 442,000 acres of private land.

This environmental impact statement (EIS) responds to requirements of the National Environmental Policy Act of 1969 to analyze the impacts of projects having significant impacts on the environment and to the Federal Land Policy and Management Act's mandate to provide for the orderly use and development of public rangelands and to preserve the land and its resources.

Between 1979 and 1980, BLM completed resource inventories that revealed the public rangelands were producing less than their potential and that important resource conflicts needed to be resolved. A draft land use plan was completed in 1981. It pulled together numerous recommendations into a comprehensive proposal for rangeland management in the planning area. The overall objective of the rangeland management program is to improve the productivity of rangelands and to fulfill social, economic, and environmental needs within the EIS area.

To help "scope" and summarize significant issues concerning the proposed rangeland management program, BLM held a series of meetings and open houses in 1980 and 1981 to get the public involved in the review and analysis of management recommendations. Many of the issues discussed in the EIS have come out of this scoping process.

Upon completion of the EIS, BLM managers will determine what actions will constiite the rangeland management program for the planning area. The decision will respond to the following questions:

- With demand for limited forage often exceeding supply, how many livestock, wild burros, and big-game animals should graze the public lands?
- What level or intensity of grazing management should BLM implement on public lands to achieve management objectives, recogizing the need to weigh resource benefits against economic costs?
- What rangeland developments should be built to support grazing management and to ensure the orderly use of the public rangelands?
- What actions are needed in the program to respond to a wide range of environmental and economic concerns, including preserving sensitive riparian habitats, reducing conflicts in bighorn sheep areas, safeguarding protected plants and animals and their habitats, and stabilizing livestock operations dependent on the public lands?

The decision will consider inventory data, planning objectives, environmental impacts, economic effects, benefit-cost studies, public comments, and BLM policy.

Alternatives and Their Consequences

This EIS analyzes the following five rangeland management alternatives.

1. Proposed Grazing Management *(Proposed Action)*
2. Continuation of Present Grazing Management *(No Action)*
3. Intensive Grazing Management *(Intensive Grazing)*
4. Seasonal Grazing Management *(Seasonal Grazing)*
5. Elimination of Livestock Grazing on Public Land *(No Grazing)*

Table S-1 compares and summarizes the alternatives, and Table S-2 summarizes long-term impacts.

PROPOSED GRAZING MANAGEMENT

Description

The *Proposed Action* corresponds to recommendations for rangeland management in Step 2 of the Lower Gila North Management Framework Plan (MFP) and is BLM's preferred alternative. The proposal recommends actions designed to improve the condition of important riparian areas, enhance critical wildlife habitats, and protect sensitive resources to meet rangeland management objectives.

In response to budget constraints and new rangeland policy, BLM would focus on changing management in areas where resources conflict and where BLM has a reasonable opportunity to resolve the conflicts and improve rangeland conditions. The proposal would emphasize favorable benefit-cost ratios for rangeland developments and concentrate limited funds in areas that most need attention and where the greatest gain can be realized. Monitoring would provide data for use in determining if management objectives are being met and on which BLM would base future management changes.

At first BLM would hold livestock grazing to current levels (initial stocking rates). as determined by average licensed use from 1976 to 1980. Stocking at this level would reduce livestock 16 percent from authorized grazing preference. BLM would monitor utilization of key plant species and would change livestock numbers

TABLE S-1
SUMMARY OF ALTERNATIVES

	Proposed Action	No Action	Intensive Grazing	Seasonal Grazing	Ephemeral Option	No Livestock
Proposed Grazing Management Level (Number of Allotments)						
Intensive	10	1	36	1	1	0
Less Intensive	16	0	0	0	0	0
Nonintensive	45*	0	35*	35*	35*	0
Seasonal	0	0	0	35	27	0
Yearlong	0	35	0	0	0	0
Custodial	0	35	0	0	0	0
Ephemeral	7*	7	7*	7*	15*	0
Reserved for Wildlife or Burros	1*	1	1*	1*	1*	79
Initial Forage Allocation (AUMs)						
Livestock	49,051	58,155	49,051	49,051	44,536	0
Change from Authorized Grazing Preference (%)	-16	0	-16	-16	-23	-100
Big Game	9,574	0	9,574	9,574	9,574	9,574
Burros	1,260	0	1,260	1,260	1,260	1,860
Proposed Rangeland Developments						
Reservoirs	0	0	21	0	0	0
Spring Developments	3	0	10	7	7	0
Wells	7	0	38	23	23	0
Pipeline (Miles)	2	0	10	7	7	0
Fence (Miles)	41	0	122	0	0	1,750
Cattle Guards	0	0	0	0	0	150
Gates	0	0	0	0	0	115
Construction Cost ($000)	280.8	0	1,307.6	370.3	370.3	7,651.5
Yearly Maintenance Cost ($000)	3.6	0	28.2	5.8	5.8	90.7
Workmonths Required Above FY82 Level						
Implementation	50	0	90	40	40	40
Monitoring	24	0	40	20	20	20
Benefit-Cost Ratios						
Overall Ratio	1.5:1	N/A**	0.7:1	1.2:1	1.2:1	N/A**
Allotments above 1:1	9	N/A**	9	20	20	N/A**
Allotments below 1:1	0	N/A**	26	0	0	N/A**

* These allotments are combined under the general heading of Nonintensive Management in the narrative to simplify analysis and conform to new BLM policy.
** N/A = Not applicable.

where needed to achieve an average utilization of 50 percent. Supplemental licenses could be issued in years of abundant ephemeral growth. Three levels of grazing management would be implemented throughout the EIS area.

• *Intensive grazing management* would be implemented on nine allotments that show a favorable benefit-cost ratio and potential for increased forage production or where needed to resolve significant resource conflicts. BLM would prepare allotment management plans (AMPs) in cooperation with ranchers and other affected interests. AMPs would describe grazing treatments to increase forage production and improve plant vigor and composition.

• *Less intensive grazing management* would be implemented on 16 allotments where rangeland condition and trend are acceptable and present management is satisfactory. BLM would not develop grazing systems but would specify numbers and kind of livestock, period of use, and rangeland developments for resource management.

• *Nonintensive grazing management* would be implemented on 53 allotments where the potential for increased forage production is low, benefit-cost ratios for intensive management are unfavorable, or small amounts of public land make intensive management impractical. Seven of these allotments would be kept under ephemeral management, and one would continue to be reserved for wildlife habitat.

To implement intensive grazing systems, BLM would build the following rangeland developments at a cost of $280,000: three springs, three wells, 2 miles of pipeline, and 41 miles of fence. BLM would implement the proposal over a 6-year period from 1983 to 1989. The *Proposed Action's* goal is to reach management objectives within 20 years of implementation.

BLM proposes numerous measures for resource protection and enhancement to reduce adverse impacts or resolve resource conflicts. Major recommendations under the *Proposed Action* include the following.

• Remove 100 excess wild burros and maintain an average population of 200 in the Alamo Herd Management Area. Provide burros freedom of movement and access to major waters, and ensure that they have adequate forage.

• Remove wild burros from the Big Horn, Granite Wash, Harquahala, and Little Harquahala Mountains to end conflicts with bighorn sheep, protected plants, and private land use and to prevent further damage to sensitive resources.

• Restore deteriorated riparian habitats by fencing, planting seedlings, implementing rotational grazing, designing habitat management plans, and designating areas of critical environmental concern (ACECs).

• Protect threatened, endangered, and sensitive plants through fencing, reducing utilization, and designating ACEC'S

• Provide safe access and year-round water for wildlife at 150 livestock waters.

• Ensure adequate forage for existing numbers of big game. As the rangeland produces more forage, increase big-game forage allocations until desired big-game numbers are reached.

• Reduce livestock-bighorn conflicts by lowering utilization, designing proper grazing systems, and separating bighorns from domestic sheep.

• Reduce competition in crucial desert tortoise habitats by seasonally excluding livestock or designing suitable grazing systems.

Consequences

The *Proposed Action* would have the greatest impact on vegetation, wildlife, livestock grazing, wild burros, and economic conditions and would have slight to no impacts on other resources. Geology, minerals, air quality, climate, topography, urban land use, wilderness values, and social attitudes and values would not be measurably affected. Soils, water, cultural and visual resources, and recreation would be only slightly affected.

Vegetation

Over a 20-year period, the *Proposed Action* would increase vegetation production and percent plant cover and improve rangeland condition. Vegetation production would increase from 490 to 515 million pounds, and overall cover would slightly increase. The greatest increase in cover would occur in the riparian vegetation type (from 52 to 57 percent) and on allotments proposed for intensive grazing. By improving species composition and plant vigor and increasing seedling establishment, the *Proposed Action* would improve rangeland condition. Acres in good condition would increase from 412,500 to 552,700. Trend would improve on intensively managed allotments but would not greatly change on other allotments.

Critical riparian areas would be protected by implementing grazing systems and applying measures for resource protection and enhancement. Cover and key species composition would increase, and condition would improve.

Livestock Grazing

The *Proposed Action* would at first reduce allowable livestock numbers on public land by 16 percent from authorized grazing preference. Intensive management on nine allotments would require switching from continuous or sporadic grazing to grazing systems with periodic rest and would increase operator workloads and expenses. In addition, livestock would have to change their grazing habits. As

rangeland conditions improve on intensively managed allotments, desirable livestock forage would increase, increasing weights and calf crops and reducing death losses.

Wildlife

The *Proposed Action* would significantly change 837,100 acres of wildlife habitat but leave unchanged 555,900 acres. More than 20 years would be needed for most habitat changes, since they are closely tied to vegetation changes.

Game would benefit from improved rangeland condition, increased forage, and decreased competition. In the long term, deer numbers would increase by 430, bighorn sheep by 40, and javelina by 430. Productivity of upland and small-game habitat would increase by 5 percent in the long term, and upland and small game would benefit from new waters and the ecotones formed by the surrounding habitat.

Riparian habitat quality would continue to deteriorate along present trends in the short term, but in the long term, broadleaf trees would replace older decadent trees on 50 percent of riparian habitat, improving its quality for dependent wildlife.

Wild Burros

Burro use would end on three use areas, and burro numbers in the Alamo Herd Area would be reduced from 300 to 200. This burro removal would reduce forage and water competition in crucial wildlife habitat and alleviate problems of trespass burros on residential and farm land. On the other hand, the removal program would cause temporary stress for some livestock, wildlife, and burros and accrue costs in burro monitoring and management. Intensive grazing management on the Santa Maria allotment and measures to protect critical riparian areas could inhibit burro movement and access to some waters.

Economic Conditions

The *Proposed Action* would have both adverse and beneficial impacts on EIS livestock operators. In the long term, annual net revenue for small, medium-size, and large ranches would increase, as would total net revenues over a 20-year period. In the long term, the value of the typical small ranch would decrease by $1,500, the value of the typical medium-size ranch would increase by $2,000, and the value of the typical large ranch would decrease by $207,000. Total operating expenses of all ranches would increase by $40,000, and labor needed to run all ranches would increase by 2 workyears. Total gross receipts for all ranches, however, would increase by $411,000. The *Proposed Action* would not greatly affect the regional economy, in which EIS area livestock grazing plays only a small role.

CONTINUATION OF PRESENT GRAZING MANAGEMENT

Description

The *No Action* alternative is addressed in accordance with BLM policy and Council on Environmental Quality regulations. It proposes no change in present grazing management and would allow livestock numbers to remain at authorized grazing preferences. No forage would be allocated to big game or wild burros, although existing numbers of big game and wild burros would use the EIS area. Wild burro numbers would be held to 610.

Under *No Action,* 35 allotments would continue under yearlong grazing, 1 allotment would be reserved for wildlife, 1 would be managed intensively, and 35 would be custodially managed. Existing rangeland developments would be maintained, but no new developments would be built except by livestock operators where needed for the orderly use of the rangeland. BLM would periodically inspect allotments and monitor for trespass and would apply standard operating procedures for its rangeland management program. These procedures would protect cultural resources, protected and sensitive plants and animals, visual resources,wildernesss values, big game, and other wildlife.

Consequences

As under the *Proposed Action, No Action* would mainly affect vegetation, livestock grazing, wildlife, and wild burros. Other resources and economic and social conditions would be only slightly impacted at most.

Vegetation

Continuation of present grazing would not benefit vegetation. Key forage would be overutilized in many areas year after year, rangeland in unsatisfactory condition would not improve, and some areas would continue to deteriorate slowly. Desirable perennial plants and cover would decline, although cover would only slowly change. Overall rangeland condition of public lands would slightly decline, but existing trends would continue: 21 allotments improving, 47 remaining static, and 10 declining. Percent key species composition would decline in areas deteriorating to a lower rangeland condition class. The condition of riparian

vegetation would slightly decline in broadleaf riprian areas but not change in mesquite-tamarisk areas. Grazing animals would continue to graze and trample protected plants.

Livestock Grazing

Livestock grazing would continue as at present. Livestock forage would decline on overstocked allotments, and grazing animals would continue to rely on ephemeral forage. The long-term value of rangeland for livestock production would decline. In the short term, high stocking rates could maintain livestock production and ranch income, but, over time, heavy stocking rates would reduce the ability of the rangeland to produce forage to sustain present grazing levels. As palatable vegetation decreases, so would livestock performance.

Wildlife

No Action would cause deterioration in wildlife habitat and reduction of some populations. Although the overall production of mule deer habitat would not greatly change, decreased forage might slightly decrease deer numbers. Decreases in cover would decrease the quality of pronghorn habitat and continue the downward trend in bighorn habitat. Upland and small-game habitat and populations would decline or remain unchanged. Nongame habitat would not noticeably change, but protected and sensitive habitat would slightly degrade with declining food and cover. Broadleaf riparian habitat would decline so that in the long term only 640 acres would be in better than fair condition.

Wild Burros

EIS area wild burro numbers would be held at 610, with burros annually consuming 3,600 AUMs of forage and 3.36 acre-feet of water. Heavy burro use would continue to disturb areas around water, desert tortoise habitat, and protected plants. Conflicts would continue to occur in wildlife habitat and on nonfederal lands. If ranchers use full authorized grazing preference, unallocated burro and wildlife use could cause a decline in rangeland productivity and in the health of the remaining burros.

INTENSIVE GRAZING MANAGEMENT

Description

This alternative would implement intensive grazing management on 35 allotments not now managed under ephemeral or custodial grazing and continue intensive management on 1 allotment. Its purpose would be to generate greater and more rapid increases in forage production and improve rangeland condition throughout the EIS area. Grazing permittees would play a significant role in developing the grazing systems and would incur a greater share of the costs of building and maintaining rangeland developments. The remaining 43 allotments would be nonintensively managed as under the *Proposed Action* because they are either designated ephemeral or have small amounts of public land.

Initial livestock forage allocations would be based on average licensed use during the past 5 years, a 16 percent reduction in authorized grazing preference. Ten spring developments, 38 wells, 21 reservoirs, 10 miles of pipeline, and 122 miles of fence would be needed to implement *Intensive Grazing* at a cost of $1,307,600. Seven allotment management plans (AMPs) would be written in each of 5 years. All measures for resource protection and enhancement that would be applied under the *Proposed Action* would be applied under *Intensive Grazing*. Other elements of the program, including grazing systems, big-game and wild burro forage allocations, and implementation schedules would be the same as those under the *Proposed Action*.

Consequences

Under *Intensive Grazing* only vegetation, livestock grazing, wildlife, wild burros, and economic conditions would be greatly impacted. The other resources at most would be only sightly impacted.

Vegetation

Intensive grazing management would significantly benefit vegetation on 36 allotments proposed for intensive management. The 43 nonintensively managed allotments, however, would undergo little change. Applying intensive grazing management to 1,095,300 acres would increase ground cover more than would the *Proposed Action*. A greater amount of rest would allow a larger percentage of the EIS area to improve more rapidly than under the *Proposed Action*. Cover in the chaparral vegetation type would increase the most — from 52 to 58 percent.

With rangeland developments, grazing systems, and forage allocations, rangeland condition would improve. Areas in excellent condition would increase by 123,000 acres, and areas in good condition would increase by 146,000 acres. Trend, as well, would improve on intensively managed allotments as key species vigor and reproduction improve. On nonintensively managed allotments, trend would not greatly change. Grazing treatments, lower utilization, and rest during critical growth periods would lead to improved condition in riparian areas. In addition, intensive grazing treatments and vegetation allocations would benefit protected plants sensitive to grazing.

Livestock Grazing

Intensive Grazing would initially reduce allowable livestock numbers on public land by 16 percent from authorized grazing preference. Thirty-five allotments would shift from continuous or sporadic grazing to grazing systems with periodic rest and seasonable deferments. More labor would be needed on intensive allotments, and the required rangeland developments would increase labor and maintenance costs. On the other hand, key forage species production would improve vigor and increase the quantity and improve the quality of livestock forage.

Livestock on intensively managed allotments would have to change their grazing habits, adapting to new terrain and water sources, increased concentrations, and more frequent handling and movement. Resulting short-term weight losses, however, would be replaced by long-term weight gains, increased calf crops, and lower death losses. Livestock performance would not measurably change on nonintensive allotments.

Wildlife

The *Intensive Grazing* alternative would benefit wildlife on the 36 allotments proposed for intensive management. Increased vegetation production would improve big-game, small-game, and upland game habitat and greatly increase big-game numbers. New waters would increase disturbed areas by 2,800 acres and increase competition for some species, but the additional water would benefit water-dependent species. The 122 miles of new fencing would little affect wildlife except for disrupting deer movement and causing entanglement. Improved ground cover would notably improve nongame habitat, mainly the lower vegetation layers needed for cover by many species.

Protected and sensitive wildlife habitat would continue to degrade for some species but in the long term improve for the following animals: bald eagle, desert tortoise, Gilbert's skink, Gila monster, and sharp-shinned and Cooper's hawk. In the short term, riparian habitat would continue to deteriorate along present trends, but in the long term broadleaf trees would reproduce and replace older decadent trees on 66 percent of their habitat.

Wild Burros

Overall, *Intensive Grazing* would have the same impacts on wild burros as would the *Proposed Action*. New fences needed to implement a grazing system on the Palmerita Ranch in the Alamo Herd Management Area, however might inhibit burro movement.

Economic Conditions

Intensive Grazing would benefit EIS area ranches in the long term. Annual net revenue for typical small, medium-sized, and large ranches would increase more than under the *Proposed Action,* as would ranch values and total net revenues over a 20-year period. Although operating expenses and workyears of labor would increase, total gross receipts for affected EIS area ranches would increase by $452,000.

SEASONAL GRAZING MANAGEMENT

Description

The *Seasonal Grazing* alternative proposes to implement seasonal livestock grazing from October 15 to June 1 on 35 allotments not now managed under intensive, custodial, or ephemeral grazing. It is designed to rest key species every year, to increase forage production, and to improve rangeland condition. Existing rangeland developments would be maintained, and new developments would be authorized for better livestock distribution and sensitive resource protection. Costing $370,300, these developments would include 7 springs, 23 wells, and 7 miles of pipeline. Initial stocking rates, big game and wild burro forage allocations, and measures for resource protection and enhancement would be the same as under the *Proposed Action.* Forty-three allotments would be managed nonintensively as under the *Intensive Grazing* alternative.

As an option under this alternative, eight allotments with low potential for perennial forage production would be classified and managed for ephemeral livestock grazing. Authorized grazing preferences would be cancelled on these allotments, and livestock grazing would be authorized only when ephemeral forage is abundant.

Consequences

Seasonal grazing would greatly impact only livestock grazing, wildlife, wild burros, and economic conditions. All other resources at most would only be slightly impacted.

Vegetation

Seasonal grazing management would benefit vegetation by allowing 4.5 months of annual rest (June 1 to October 15) on 35 allotments. The rest would remove the burden of livestock grazing from perennial forage in the late spring and allow forage to recuperate from grazing and to improve

in vigor and reproduction. New rangeland developments would improve the distribution of livestock and allow proper use on previously underused areas. In the long term, overall cover would slightly increase and rangeland condition would improve on allotments proposed for seasonal grazing. Areas in excellent rangeland condition would increase by 107,000 acres, and areas in good condition would increase by 75,600 acres. Nonintensively managed allotments would continue their current trends: 10 allotments would continue to improve in condition, 25 would remain stable, and 7 would continue to deteriorate. As rangeland condition improves, key species composition would increase

Riparian vegetation would significantly improve. Herbaceous vegetation would improve most rapidly, and woody species would also improve after protective measures are applied. Riparian plant cover would increase from 52 to 55 percent.

Seasonal Grazing would benefit the three protected plant species that might be impacted by grazing animals. *Mamillaria viridiflora* in the Harquahala and Harquvar Mountains would improve because the 4.5 months of rest would reduce trampling and improve perennial grasses on which it depends for moisture and production. *Juncus articulatus* and *Thelypteris puberula* var. *sonorensis,* both riparian species, would improve with improved riparian vegetation.

Vegetation response under the ephemeral option differ little from that under *Seasonal Grazing,* but perennial forage would be given complete rest on eight allotments. Rangeland condition on five allotments would not significantly improve because of low rainfall and low potential for perennial forage production. Declining or stable rangeland condition on the remaining three allotments would improve to an unknown extent because of higher rainfall and greater potential of the range sites. The ephemeral option would impact riparian vegetation and protected plants the same as would *Seasonal Grazing.*

Livestock Grazing

Under *Seasonal Grazing,* initial livestock stocking levels would be the same as under the *Proposed Action.* Livestock numbers would be reduced by 16 percent from authorized grazing preference. On the 35 allotments proposed for seasonal grazing, ranchers would either have to switch from cow-calf to steer operations or graze their cattle on nonpublic lands while their allotments are being rested. Seven of the 35 allotments, however, are already steer operations. New waters would better distribute livestock, and better livestock distribution and rest during the critical period of forage growth would increase more desirable forage species, which over time would increase livestock weight gains and reduce death losses.

Under the ephemeral option, grazing preference would be cancelled on eight allotments. In the long term, however, livestock would benefit from improved rangeland condition and from being on rangeland only when ephemeral forage is abundant. Increased weight gains and reduced death losses would result.

Wildlife

The 4.5 months of rest on seasonal allotments would temporarily increase forage and cover for wildlife and increase cover and production of warm-season grasses and forbs important to wildlife. On the 36 nonintensive allotments, wildlife habitat would continue to improve or decline along present trends.

Seasonal Grazing would generally benefit big game, small and upland game, and waterfowl and shorebirds. The vegetation productivity of mule deer habitat would increase, and nearly 260,000 acres of deer habitat would improve to good or excellent condition. New waters would expand the ability of deer to forage in new areas. Livestock-deer competition for browse and space, however, would seasonally increase, and cover would slightly decrease. Bighorn sheep would benefit from rested alllotments, additional waters, and increased forage. In the long term, mule deer numbers on public lands would increase to 3,330, bighorn numbers to 180, and javelina numbers to 990. Although each new water would benefit waterfowl and shorebirds, livestock disturbance of riparian areas would cause a slight decline in shorebird habitat. The productivity of upland and small-game habitat would increase by 5 percent in the long term. Increased plant cover and decreased competition for forage would mainly benefit lower layers of vegetation needed for nongame cover. Habitat with improved overall ground cover would increase by 42 percent.

In the very long term (beyond 20 years), habitat would improve for the following protected and sensitive species: bald eagle, peregrine falcon, desert tortoise, black hawk, Gilbert's skink, Gila monster, and sharp-shinned and Cooper's hawk. In the long term broadleaf trees in riparian habitat would replace older decadent trees on 66 percent of broadleaf habitat. On the remaining 34 percent, habitat quality would decline without intensive management.

By allowing more immediate short-term improvement and faster long-term improvement than *Seasonal Grazing,* the ephemeral option would have greater wildlife benefits on eight allotments than would *Seasonal Grazing.* Riparian, bighorn sheep, and desert tortoise habitat on allotments proposed for ephemeral grazing would improve faster than under *Seasonal Grazing.* In addition, all perennial forage could be grazed by mule deer without livestock competition.

Wild Burros

Seasonal Grazing would have the same impacts on burros as would the *Proposed Action,* except that no intensive grazing system would be implemented on the Santa Maria allotment. Thus, new fences would not be built that might inhibit burro movement.

Economic Conditions

Although ranch values would somewhat decrease for all typical ranch sizes and operator costs would be the highest of all alternatives, net ranch revenues and 20-year net revenues for all ranch sizes would increase more than under any other alternative. In addition, *Seasonal Grazing* would require only 16 workyears of labor for the yearly operation of all ranches, 7 workyears less than are now needed.

For the eight affected allotments, the ephemeral option would replace a somewhat dependable income source with an independable source. The value of ranches losing theiir preferences would greatly decline, making it more difficult for the ranches to borrow long-term and operating capital. Moreover, ephemeral operations involve more risk than do yearlong operations.

ELIMINATION OF LIVESTOCK GRAZING FROM PUBLIC LANDS

Description

The *No Livestock* alternative would end livestock grazing on public rangelands. It is addressed to show the impacts of removing livestock from the public lands, to provide BLM managers with a wider range of options to study, and to facilitate a meaningful comparison of alternatives. Under this alternative livestock grazing would be phased out over 5 years, but BLM would continue to monitor the rangeland for trespass and wildlife habitat conditions. BLM would allow 300 wild burros to inhabit the Alamo Herd Management Area but eliminate populations in the Big Horn, Granite Wash, Harquahala, and Little Harquahala Mountains. Rangeland developments would be built only to benefit wildlife, wild burros, watershed, and other resources. To keep livestock off public lands, 1,750 miles of fence, 150 cattleguards, and 115 gates could be needed at a cost of $7,651,500. Annual maintenance for these developments would cost $90,670. All measures for resource enhancement and protection that would be applied under the *Proposed Action* would be applied under this alternative except those that pertain specifically to livestock grazing.

Consequences

Eliminating livestock grazing on public lands would greatly affect vegetation, livestock grazing, wildlife, wild burros, and economic conditions. Other resources would at most be only slightly impacted.

Vegetation

No Livestock would significantly improve vegetation on many allotments. Most forage species grazed by livestock would be allowed to complete growth and reproduction. Utilization of key forage species would greatly decline, thereby improving vigor, reproduction, and seedling establishment. Total vegetation would increase by 7 percent, and cover would moderately increase. Rangeland condition on 70 allotments with apparent stable or upward trends would improve as a result of reduced grazing pressure on key forage species. Rangeland in excellent condition would increase from 26,400 to 150,400 acres, and rangeland in good condition would increase from 412,500 to 558,800 acres.

Riparian vegetation would rapidly improve but level off in the long term as areas stabilize. Vigorous growths of cottonwood, willow, mesquite, and saltcedar would be returned to most streambanks as well as an understory of grasses and forbs. Riparian plant cover would increase from 52 to 60 percent. The vigor and cover of the three protected species affected by grazing would improve.

Livestock Grazing

The end of livestock grazing on public lands would cause an annual loss to the livestock industry of 46,033 AUMs of forage and a livestock production loss of over 4,000 cattle.

Ranching would drastically change. Ranchers on the 35 nonintensive allotments with little public land would suffer low impacts, but the 43 allotments with higher percentages of public land would be forced to reduce herd sizes or seek other sources of forage, such as private or state lands. Ranchers continuing to operate would face management problems. A highly intermingled land ownership pattern would limit grazing management alternatives and require frequent movement of cattle. And ranchers would need to invest large amounts to develop waters on isolated tracts of private or state land to make them suitable for grazing.

Wildlife

No Livestock is the only alternative that would measurably improve habitat on 25 custodial allotments with a static

or downward apparent trend. Habitat would improve more than it would under increased vegetation production alone, and improvement would occur in the short and long term. In the long term the forage productivity of mule deer habitat would increase by 7 percent and bighorn sheep habitat by 16 percent. Deer numbers on public lands would increase from 2,800 to 4,440, bighorn from 100 to 250, antelope from 0 to 5. and javelina from 560 to 1,040. Plant cover around waters and riparian areas would significantly increase, greatly benefiting waterfowl and shorebirds. Quail cover and forage would increase, and nongame habitat would significantly improve as a result of a 7 percent increase in forage, increased plant cover, and increased height and cover of unused grasses and forbs. Most protected and sensitive wildlife habitat would improve, and many protected and sensitive wildlife populations would increase.

In the long term, riparian habitat condition would improve by nearly 30 percent, and no broadleaf riparian habitat would remain in poor condition. Woody riparian plants would flourish, and the structural diversity of riparian vegetation would increase.

The frequency of wildfires would increase as fuel production increases by 15 percent. If allowed to burn significant acreages, wildfires in certain vegetation types could increase the production of forage and cover as well as speed up beneficial habitat changes.

Wild Burros

The *No Livestock* alternative would have beneficial and adverse impacts relating to wild burros. The removal of burros from certain mountain areas would reduce burro-bighorn competition and the trampling of desert tortoise critical areas and provide relief to protected plants. In addition, removing allotment boundary fences could allow greater mixing of burros for genetic survival. New fencing separating public from nonpublic lands, however, could interfere with burro movement. Other adverse impacts include the removal of a genepool of red burros and white burros in the Harquahala-Big Horn Mountains; conflicts in the Alamo Herd Management Area with raptors, protected plants, and bighorn sheep reintroductions; and the conflict between burro grazing around Alamo Lake and plans to establish waterfowl habitat.

Economic Conditions

Eliminating livestock grazing on public lands would severely impact EIS area ranches. Herd sizes would have to be reduced an average of 73 to 85 percent depending on ranch size, and net income would decline by as much as 90 percent. The 20-year net revenue value of all size ranches would greatly decline, as would ranch values. Ranchers would have difficulty borrowing capital or repaying existing loans, and operators of most medium-size and large ranches would probably have to seek outside income. Ranches put up for sale might be combined to form an economic unit, but tracts with large amounts of public land would be difficult to run as integral ranches due to distances between state and private holdings. Total ranch operating expenses would decline from $497,000 to $128,000; total gross receipts would decline from $996,000 to $191,000; and the amount of labor needed to operate ranches would decline from 23 to 3 workyears.

Installing fences, cattleguards, and gates would add $765,000 per year in earnings to the regional economy, but this amount would be less than 1 percent of the economic study area's yearly construction earnings.

TABLE S-2
IMPACT SUMMARY—20 YEARS AFTER IMPLEMENTATION

Resource Elements	Existing Situation	Proposed Action	No Action	Intensive Grazing	Seasonal Grazing	Ephemeral Option	No Livestock
Vegetation							
Vegetstion Production (lbs.)	490,120,000	514,626,000	490,120,000	519,527,000	512,175,000	513,155,000	524,428,000
Plant Cover	NA[1]	Slight Increase	Slight Decrease	Slight Increase	Slight Increase	Slight Increase	Mod. Increase
Rangeland Condition (acres):							
Excellent	26,400	146,000	25,700	149,400	133,400	133,400	150,400
Good	412,500	552,700	412,000	558,500	488,100	488,100	558,800
Fair	713,600	496,600	714,400	492,800	572,100	572,100	492,000
Poor	222,300	179,500	222,600	174,000	181,100	181,100	173,600
Soils							
Sediment Yield (acre-feet/mi^2/year)	0.6[3]	Slight Decrease	Slight Increase	Slight Decrease	Slight Decrease	Slight Decrease	Great Decrease
Acres Permanently Disturbed	NA[1]	9	NA[1]	43	10	10	191
Erosion	NA[1]	Decrease	Mixed	Decrease	Slight Decrease	Slight Decrease	Decrease
Compaction	NA[1]	Slight Decrease	No Change	Decrease	Slight Decrease	Slight Decrease	Decrease
Water Resources							
Consumption by Grazing Animals (acre-feet)	63	68	63	72	69	69	8
Surface Water Quality	NA[1]	No Change	Slight Decline	Slightly Improve	Slightly Improve	Slightly Improve	Improve
Wildlife							
Big-Game Forage (AUMs)	0	11,489	0	12,331	12,179	12,179	15,970
Big-Game Numbers (Public Land):							
Mule Deer	2,800	3,230	2,600	3,490	3,330	3,330	4,440
Pronghorn Antelope	0	0	0	0	0	0	5
Desert Bighorn Sheep	100	140	100	180	180	180	250
Javelina	560	990	740	1,040	990	990	1,040
Wildlife & Habitat Impacts:							
All Wildlife	NA[2]	Mixed	Adverse	Low Benefit	Mixed	Low Benefit	Benefit
Riparian	NA[2]	Low Benefit	High Adverse	Low Benefit	Low Benefit	Benefit	High Benefit
Wild Burros							
Burro Forage (AUMs)	0	1,260	0	1,260	1,260	1,260	1,860
Burro Population	450	210	610	210	210	210	310
Cultural Resources							
Change in Adverse Impacts to Cultural Resources	NA[2]	Mod. Increase	Low Increase	High Increase	Low Increase	Low Increase	High Decrease
Recreation (Visitor Days)							
Big Game Hunting	3,500	4,050	3,350	4,300	4,100	4,100	5,800
Livestock Grazing							
Allocated AUMs (Maximum Allowable on Public Lands)	58,155	53,730	58,155	55,181	52,696	47,651	0
Change from Authorized Grazing Preference (%)	NA[2]	-8	0	-5	-9	-18	-100
Livestock Performance							
14 Small Ranches (0-99 head)							
Calf Crop (%)	79	83	79	83	NA[2]	NA[2]	NA[2]
Steer Calf Weaning Weight (lbs.)	420	468	420	468	NA[2]	NA[2]	NA[2]
Heifer Calf Weaning Weight (lbs.)	365	413	365	413	NA[2]	NA[2]	NA[2]
Cull Cow (%)	17	16	17	16	NA[2]	NA[2]	NA[2]
10 Medium-Size Ranches (100-199 head)							
Calf Crop (%)	76	83	76	83	NA[2]	NA[2]	NA[2]
Steer Calf Weaning Weight (lbs.)	420	468	420	468	NA[2]	NA[2]	NA[2]
Heifer Calf Weaning Weight (lbs.)	365	413	365	413	NA[2]	NA[2]	NA[2]
Cull Cow (%)	16	15	16	15	NA[2]	NA[2]	NA[2]
9 Large Ranches (>200 head)							
Calf Crop (%)	70	83	70	83	NA[2]	NA[2]	NA[2]
Steer Calf Weaning Weight (lbs.)	380	428	380	428	NA[2]	NA[2]	NA[2]
Heifer Calf Weaning Weight (lbs.)	360	408	360	408	NA[2]	NA[2]	NA[2]
Cull Cow (%)	15	14	15	14	NA[2]	NA[2]	NA[2]
Economic Conditions							
Net Revenues ($):							
Small Ranch	5,300	7,220	5,300	7,760	7,620	NA[1]	520
Medium-Size Ranch	12,090	19,940	12,090	20,170	19,760	NA[1]	2,240
Large Ranch	33,810	63,210	33,810	64,690	71,990	NA[1]	3,670
20-Year Net Revenue Value:							
Small Ranch	54,570	62,670	54,570	64,920	73,270	NA[1]	5,370
Medium-Size Ranch	124,460	157,600	124,460	158,610	195,400	NA[1]	23,040
Large Ranch	348,000	472,190	348,000	478,480	702,980	NA[1]	37,740
Ranch Values ($)							
Small Ranch	85,500	84,000	85,500	85,500	85,500	NA[1]	12,000
Medium-Size Ranch	229,000	231,000	229,500	238,500	220,500	NA[1]	55,500
Large Ranch	1,020,000	813,000	1,020,000	831,000	807,000	NA[1]	124,500
Gross Sales Revenue ($)	996,000	1,407,000	996,000	1,448,000	1,893,000	NA[1]	191,000
Operating Expenses ($)	497,000	537,000	497,000	555,000	941,000	NA[1]	128,000
Workyears (%)[4]	23	25	23	26	16	NA[1]	3

[1] NA = Data not available.
[2] NA = Not applicable.
[3] Median value.
[4] Refer to Glossary for definition of a workyear.

Chapter 1

PURPOSE AND NEED

CHAPTER 1

PURPOSE AND NEED

Introduction

This environmental impact statement (EIS) considers the possible consequences of five alternatives for grazing management on public rangelands in the Lower Gila North Planning Area. Grazing programs on these lands are administered by the Bureau of Land Management (BLM) out of the Lower Gila Resource Area in the Phoenix District. The planning area is located in southwestern Arizona and includes portions of Yuma, Yavapai, and Maricopa Counties (Map 1-1). This EIS also considers portions of four grazing allotments that extend from the planning area into southern Mohave County. Public lands addressed in this study make up 52 percent (1,393,000 acres) of all lands within the area. State lands make up 32 percent (847,000 acres) and private lands 16 percent (442,000 acres).

Historically, livestock grazing has constituted a major part of the land use throughout the area. Many ranches depend heavily on public lands to support their operations. The lands have also provided habitat for a wide variety of wildlife and have supported herds of wild burros. Competition among users for limited forage has led to conflicts that impact watershed, wildlife habitat, and rangeland productivity.

Purpose of the Action

BLM is under congressional mandate to provide for the orderly use and development of the public rangelands and to preserve the land and its resources from destruction or unnecessary injury. The Federal Land Policy and Management Act of 1976 (FLPMA) directs BLM periodically to inventory the lands and to consider present and future uses in its land use plans. These plans are to ensure that public rangelands are managed on a multiple-use and sustained yield basis and that the quality of natural resources is preserved.

To comply with these requiremments, BLM's Phoenix District inventoried rangeland resources for the planning area in 1979 and 1980. The inventories revealed that most of the area is in fair (52 percent) or good (30 percent) condition with an overall static trend. They also revealed that potential for rangelead improvement greatly varied, often being limited by soil productivity and low precipitation.

Authorized grazing preference for livestock was set in 1973 on the basis of historical licensed use. Rangeland inventory data did not exist for this adjudication, nor was vegetation allocated to wildlife or burros.

In response to these issues, in early 1981 BLM developed a grazing management program in a land use plan (management framework plan or MFP). In the plan, BLM proposes to monitor rangeland resources, including condition and trend, and adjust grazing levels to achieve a moderate (50 percent) utilization of key plant species. The program proposes developing grazing treatments by allotment, building rangeland developments, and allocating forage to livestock, wildlife, and wild burros.

The overall objective of the proposal is to improve productivity of the public rangelands over a 20-year period and thereby serve a range of social, economic, and environmental needs. The following list presents EIS area objectives developed in the MFP and BLM policy statements (BLM, 1979d).

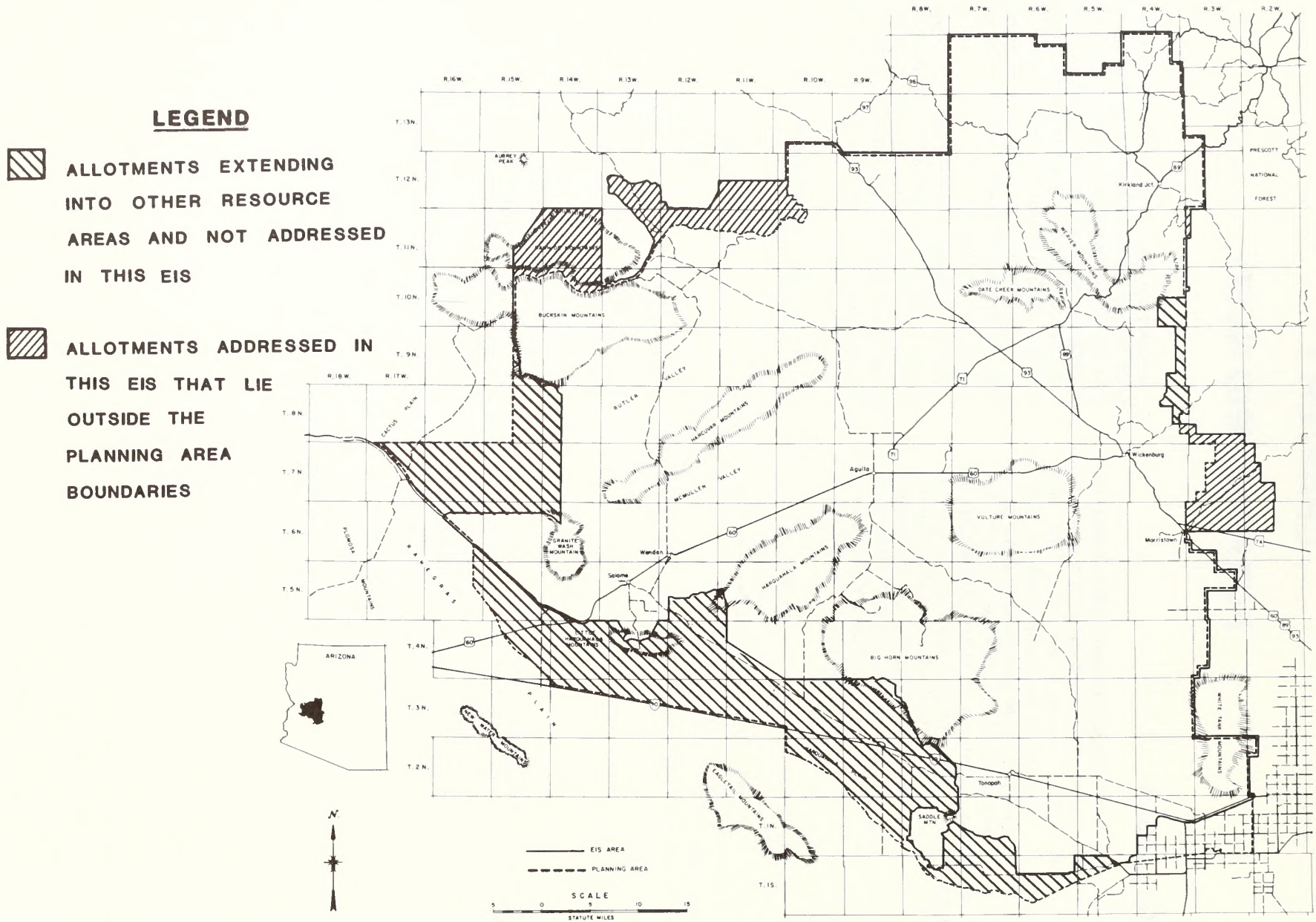
1. Improve ecological rangeland condition on 1,374,800 acres of public lands over a 20-year period as follows:[1]

Condition Class	Present Acres	Future Acres
Excellent	26,400 (2%)	146,000 (11%)
Good	412,500 (30%)	552,700 (40%)
Fair	713,600 (52%)	496,600 (36%)
Poor	222,300 (16%)	179,500 (13%)

2. In 20 years increase public rangeland forage for consumptive uses by 11 percent, from 59,900 to 66,500 animal unit months (AUMs).
3. Reduce short-term disruption and ensure the long-term stability of the local livestock industry and the economy of communities dependent upon public lands.
4. Maintain viable wild burro populations in designated herd management areas in balance with their habitat and other multiple uses. Ensure enough forage for burros and their access to water.
5. Within 10 years improve habitat on public land for upland and small game. Enhance wildlife populations by improving structural habitat diversity and rangeland condition. Within 20 years improve big-game habitat on public land throughout the EIS area to support reasonable numbers of big game.
6. Within 10 years improve the habitats of 26 protected or special status animal species on 1 million acres of public lands and maintain them in satisfactory condition.

[1] A total of 18,200 acres of federal land in the White Tanks allotment were not surveyed and are not included in these figures.

LOWER GILA NORTH PLANNING/EIS AREA



MAP 1-1

7. Protect the habitats of sensitive, state-listed, or federally listed plant species. Maintain species diversity and allow recovery of disturbed sites in six significant botanical areas within the EIS area.
8. Restore deteriorated riparian habitats along the Bill Williams, Santa Maria, and Hassayampa Rivers and improve 6,000 acres of wetlands on Centennial Wash. Thereafter maintain the following habitats in satisfactory condition: 900 acres of cottonwood-willow habitat, 1,200 acres of mixed broadleaf habitat, 9,000 acres of mesquite-saltcedar habitat, and 25 miles of aquatic habitat.

This EIS assesses the environmental consequences of implementing the proposed grazing management program and alternatives for reaching the rangeland management objectives for the Lower Gila North EIS Area. The study also responds to the amended 1974 court settlement of the suit initiated by the Natural Resources Defense Council, Inc., in which BLM was directed to prepare 144 grazing EISs for public rangelands in the western United States.

Lower Gila North Land Use Plan

PLANNING AND DECISIONMAKING PROCESS

The proposed grazing management program was developed as part of the Lower Gila North Land Use Plan. The following narrative describes the overall planning process as it has occurred to date. It also identifies the steps BLM managers will take in making grazing management decisions.

Resource Inventories

Between 1979 and 1980, Phoenix District resource specialists gathered information on nine basic resources: lands, minerals, forest products, rangeland management, watershed, wildlife habitat, recreation, wilderness, and cultural resources. The inventories involved field studies, literature searches, and consultation with agencies, organizations, and individuals. This information provided the data base for developing the land use plan.

Unit Resource Analysis

From September 1980 through January 1981, District staff prepared a unit resource analysis (URA) for the planning area (BLM, 1981a). The URA consists of three sections: a base map, a physical profile of the unit, and a description of the present situation of each of the nine resource categories. The District conducted a workshop in January 1981, during which selected members of the public helped develop management opportunities for each resource.

Social-Economic Analysis

BLM specialists compiled social, economic, and demographic information into a social-economic profile (SEP) for the Lower Colorado region (BLM, 1979a). This information was used to prepare a planning area analysis (PAA) in December 1980 for the Lower Gila North Planning Area (BLM, 1981b). The PAA analyzes social, economic, environmental, and institutional values.

Management Framework Plan

In its final form, the management framework plan (MFP) is BLM's land use plan for a particular area. Its preparation involves three steps.

From January through April 1981, District resource specialists developed Step 1 of the MFP, which includes objectives and specific recommendations for each of the nine resource categories. A workshop in January allowed individuals, organizations, and other agencies to participate in this phase.

Step 2 began in April 1981 with a second round of workshops to encourage broader public involvement in resolving conflicts among resource recommendations. The manager of the Lower Gila Resource Area then drafted multiple-use management recommendations, which considered public comments and social, economic, and environmental factors in resolving Step 1 conflicts. During this phase, recommendations were completed for allocating vegetation to competing uses.

A series of public meetings and open houses in July 1981 encouraged pulic involvement in the review and analysis of management recommendations. The meetings helped summarize significant issues identified during the planning process and generated public comments on potential alternatives to be addressed in the grazing EIS. By so doing, the meetings helped BLM meet requirements for a public scoping process set forth in the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act. See Appendix 1 for details of the scoping process. Considering public comment, management recommendations were completed shortly thereafter (See Table I-1).

Step 3 of the MFP is completed when the Phoenix District Manager makes a decision on the multiple-use recommendations. This decision constitues the land use plan. Decisions on rangeland management recommendations will be made no sooner than 30 days after the final grazing EIS is filed with the Environmental Protection Agency.

BLM Involved Public In Land Use Planning

Interested members of the public participated in each phase of planning for management of public lands in the Lower Gila North Area. Here a group tours lands impacted by heavy burro use before BLM makes recommendations for controlling wild burro numbers.

Environmental Assessment

An interdisciplinary team of resource specialists analyzed the environmental consequences of the MFP Step 2 grazing management recommendations (the *Proposed Action*) and compared them to the consequences of reasonable alternatives developed during the scoping process. This EIS documents the analysis and comparisons.

Shortly after the final EIS has been filed, the BLM Phoenix District Manager will select one of the alternatives or a combination of alternatives as the grazing management program for the planning area. In making this selection, the District Manager will consider rangeland inventory analysis, multiple-use planning objectives, environmental impacts, economic effects, benefit-cost studies, and public comments. The District Manager will document his selection and the rationale leading to it in a rangeland program summary for the planning area. The document will be distributed to the public.

ISSUES IDENTIFIED

During the preparation of the land use plan, the following significant issues were identified that warranted detailed analysis in the EIS.

1. Important riparian habitats along the Bill Williams, Santa Maria, and Hassayampa Rivers are in unsatisfactory condition. Special measures are needed to restore and protect these sensitive wildlife areas.
2. Wild burro use is conflicting heavily with bighorn sheep habitat, protected plant and animal species, or private land use in three herd areas within the EIS area.
3. The EIS area's rangelands are producing less than their potential vegetation. Demand for forage from livestock, wildlife, and wild burros often exceeds supply.
4. Livestock grazing conflicts with sensitive wildlife species, including bighorn sheep and desert tortoise. Patterns of livestock use may have to be changed to resolve the conflicts with these sensitive species.
5. Livestock operators may suffer social and economic impacts from proposed reductions in grazing authorizations.
   a. Decreased livestock sales may cause a potential short-term loss of rancher income.
   b. Ranch market values on public range may decline due to decreases in authorized stocking rates.

c. Historical grazing patterns may be disrupted.

Through scoping, BLM determined that the following issues also warrant analysis in the EIS. Because related impacts are not expected to be as significant as those listed above, the analysis will be correspondingly brief.

1. Impacts to water quality
2. Impacts to soil erosion and productivity
3. Impacts to community and regional socioeconomic conditions
4. Impacts to visual resources
5. Impacts to cultural resources
6. Impacts to protected plant and animal species
7. Impacts to outdoor recreation
8. Impacts to wilderness values

Through the scoping process, BLM determined that impacts to the following resources would be negligible or nonexistent and that analysis would be dropped altogether. Descriptions of these resources will be included as needed to analyze impacts to other affected areas.

1. Climate
2. Topography
3. Geology and minerals
4. Air quality
5. Urban land uses

ALTERNATIVES SELECTED

Issue identification during the planning and scoping process contributed to the selection of five alternatives for rangeland management (including the *Proposed Action*). By providing a range of use levels between no action and no grazing, the alternatives allow for a useful and effective comparison of impacts. They also establish a wide range of options from which BLM managers can make a decision. The following alternatives have been selected for analysis in this EIS.

1. *Proposed Grazing Management Program (Proposed Action)*
2. *Continuation of Present Grazing Management (No Action)*
3. *Intensive Grazing Management (Intensive Grazing)*
4. *Seasonal Grazing Management (Seasonal Grazing)*
5. *Elimination of Livestock Grazing (No Livestock)*

TABLE 1-1
MFP RECOMMENDATIONS AFFECTING RANGELAND MANAGEMENT

MFP-1 Recommendations	Conflicting MFP-1 Recommendations	Multiple-Use (MFP-2) Recommendations	Resource Trade-Offs
1. Allocate 49,051 AUMs of forage to livestock on 66 allotments based on 5-year average licensed use and five allotments based on grazing preference. Monitor utilization of key forage species and adjust livestock numbers as needed to limit average utilization to moderate levels (40 to 60 percent). Use rangeland inventory data to identify allotments requiring special monitoring or supervision, including allotments with unsatisfactory condition or apparent trend and eight candidates for ephemeral classification having low perennial forage production. Allocate ephemeral forage to livestock on seven ephemeral allotments and no forage on one allotment reserved for wildlife. Allocate supplemental forage on perennial-ephemeral allotments during years of abundant ephemeral growth (supplemental licenses may authorize grazing by sheep on four allotments).	1. Reduce livestock-big game competition around waters and on portions of nine allotments. Decrease browse utilization to 40 percent on eight allotments and in bighorn lambing areas.	1. Same as Rangeland Management MFP-1, modified as follows. Decrease cattle densities in bighorn habitat to reduce livestock-bighorn competition and separate domestic sheep from bighorns as far as practical. Decrease browse utilization to 40 percent on eight allotments and in bighorn lambing areas.	1. Grazing systems must reduce livestock congregations in key bighorn habitats and domestic sheep would not be grazed in bighorn areas. Monitoring may lead to lower livestock numbers to reach a 40 percent utilization in key areas.
	Allocate forage increases to wildlife to support optimum numbers of big game.	Allocate forage increases first to meet the needs of reasonable numbers of big game and then to increased demands from livestock.	Long-term forage increases would not support optimum numbers of wildlife but would be allocated first to meet the needs of reasonable wildlife numbers and then to meet increased livestock demands.
	In riparian areas, limit utilization of key plants to 40 percent and cottonwood and willows to 20 percent.	Improve riparian habitats by limiting utilization of key plants in riparian zones to 40 percent and cottonwoods and willows to 20 percent.	Grazing systems must be designed or livestock numbers reduced to reach lower utilization rates in riparian habitats.
	Maximize use of herbaceous forage by desert tortoises in 20,500 acres of conflict areas. Eliminate sheep grazing on the Ohaco allotment by 1984.	Improve rangeland condition and develop pastures around crucial desert tortoise habitats to facilitate rest between February and July. Exclude domestic sheep between February 1 and June 30 in crucial desert tortoise areas in the Ohaco allotment.	Grazing systems must be designed to enhance crucial desert tortoise habitat. Domestic sheep would continue to graze in the Ohaco allotment but would be restricted between February 1 and June 30.
2. Implement intensive grazing systems on nine allotments and continue intensive grazing on the Pipeline allotment using grazing treatments that ensure rest, improve rangeland condition, and increase forage production. Allotments selected have favorable benefit-cost ratios and potential for good vegetation response.	2. Protect 7,000 acres of pristine botanical area on the north slope of Harquahala Mountain from intensive livestock grazing and construction of water developments.	2. Implement a grazing system that maintains the pristine character of the north slope of Harquahala Mountain. Build no water developments in the area.	2. No water developments would be built on north slope of Harquahala Mountain.
	Control season and intensity of livestock grazing to protect riparian habitats.	Implement rangeland management practices and habitat management plans to protect riparian habitats.	Livestock grazing would be controlled as needed to protect riparian habitats.
3. Implement less intensive management on 16 allotments showing acceptable rangeland condition with stable or upward apparent trend. Allotments selected would have unfavorable benefit-cost ratios under intensive management.	3. Control season and intensity of livestock grazing to protect riparian habitats.	3. Implement rangeland management practices and habitat management plans to protect riparian habitats.	3. Livestock grazing would be controlled as needed to protect riparian habitats.

TABLE 1-1 (Continued)
MFP RECOMMENDATIONS AFFECTING RANGELAND MANAGEMENT

MFP-1 Recommendations	Conflicting MFP-1 Recommendations	Multiple-Use (MFP-2) Recommendations	Resource Trade-Offs
4. Implement nonintensive management on 51 allotments having ephemeral designation, low potential for increased vegetation production, or relatively small amounts of public land. Give priority to monitoring allotments with declining rangeland condition to determine the need for ephemeral designation, seasonal management, or reduced stocking levels.	4. Same as 3 above.	4. Same as 3 above.	4. Same as 3 above.
5. Build new rangeland developments needed to implement intensive grazing systems and to provide multiple-use benefits.	5. Avoid subdividing bighorn lambing areas with fencing.	5. Build no fences through bighorn lambing areas.	5. Grazing systems must avoid fence construction in lambing areas.
	Maintain access for wild burros to livestock waters and Alamo Lake.	Limit the number or modify the design of new structures which would restrict wild burro movement in herd areas.	Rangeland developments must be built to minimize disruption of wild burro access to waters.
6. Maintain wild burro populations of 200 in the Alamo Herd Management Area (HMA), 100 in the Harquahala Mountains, and 50 in the Little Harquahala Mountains.	6. Protect sensitive wildlife habitats around cliffs in the Big Horn and Vulture Mountains from burro overuse. Reduce wild burro-bighorn competition for food, water, and space in the Big Horn, Harquahala, and Little Harquahala Mountains.	6. Maintain an average of 200 wild burros in the Alamo HMA. Remove wild burros from the Big Horn, Granite Wash, Harquahala, and Little Harquahala Mountains.	6. BLM would remove wild burro herds in the Big Horn, Granite Wash, Harquahala, and Little Harquahala Mountains.
	Cooperate with AG&FD by facilitating reintroduction of bighorns into Black and Weaver Mountains.	Facilitate AG&FD reintroduction of bighorns into the Black and Weaver Mountains.	Burro use in the Alamo HMA still poses potential conflicts with AG&FD plans to reintroduce bighorns in the Black and Weaver Mountains.
	Reduce impacts of burro overgrazing in riparian zones.	Protect cottonwood and willow reproduction in riparian zones by fencing to exclude burros.	Wild burro grazing of young cottonwoods and willows would be curtailed in riparian areas.
7. Designate a wild burro viewing route in the Alamo HMA, and install interpretive signs to enhance public awareness and enjoyment and to discourage violations of the Wild Free-roaming Horse and Burro Act.	7. None.	7. Same as MFP-1.	7. None.
8. Develop fire management plans in coordination with the rangeland management and wildlife programs to identify modified suppression areas, intensive control areas, and areas where controlled burning would be beneficial.	8. None.	8. Same as MFP-1.	8. None.

Chapter 2

ALTERNATIVES

CHAPTER 2

ALTERNATIVES INCLUDING THE PROPOSED ACTION

Introduction

Chapter 2 describes in detail the five alternatives selected for study, including the *Proposed Action,* explaining why each alternative was selected and how it may be useful in making rangeland management decisions. Chapter 2 concludes with a comparative summary of the impacts of the alternatives to provide the public and the decisionmaker with a convenient tool for defining issues and reaching conclusions.

Each alternative is described by six components where applicable:

1. *levels of grazing management* — a description of the levels of grazing management proposed for each allotment and reasons for the selection of these levels;

2. *forage allocations* — a summary of the animal unit months (AUMs) of forage that would be allocated for grazing by livestock, big game, and wild burros and required adjustments from current levels of livestock grazing;

3. *rangeland developments* — a summary of new developments needed to meet grazing management requirements;

4. *implementation* — identification of sequences and timeframes for implementing the components of the alternative;

5. *monitoring and administration* — a summary of studies needed to evaluate how well the alternative is meeting objectives for rangeland management and a summary of how and when forage allocations may be adjusted and how BLM would administer the grazing program;

6. *measures for resource protection and enhancement* — a description of safeguards applied to each proposal to reduce or eliminate adverse environmental impacts and a description of measures designed to enhance other resources affected by rangeland management.

For brevity's sake, components of the *Proposed Action* that apply to other alternatives will not be described in detail in later sections.

Description of Alternatives

PROPOSED GRAZING MANAGEMENT (PROPOSED ACTION)

Overview

The proposed grazing management program corresponds to recommendations for rangeland management in the Lower Gila North Management Framework Plan (MFP) and constitutes BLM's preferred alternative. The proposal recommends actions to improve the condition of important riparian areas, enhance critical wildlife habitats, and protect sensitive resources to meet a broad spectrum of rangeland management objectives.

In response to budget constraints and new rangeland policy, BLM would focus on changing management in areas where resources conflict and where BLM would have reasonable opportunities to resolve the conflicts and improve rangeland conditions. The proposal would emphasize favorable benefit-cost ratios for rangeland developments and concentrate limited funds in areas that most need attention and where the greatest gain can be realized. Monitoring would provide data that BLM would use to determine if management objectives are being met and on which it would base future management changes.

At first BLM would hold livestock grazing at current levels (initial stocking rates), as determined by average licensed use from 1976 to 1980. Stocking at this level would amount to a 16 percent reduction from the authorized grazing preference. BLM would monitor utiliization of key plant species and would change livestock numbers where needed to achieve an average utilization of 50 percent. Three levels of grazing management would be implemented throughout the EIS area.

- *Intensive grazing management* would be implemented on nine allotments that show a favorable benefit-cost ratio and potential for increased forage production or where needed to resolve significant resource conflicts. A tenth allotment is already under intensive management.

- *Less intensive grazing management* would be implemented on 16 allotments where rangeland condition and trend are acceptable and present management is satisfactory.

- *Nonintensive grazing management* would be implemented on 53 allotments where the potential for increased forage production is low and benefit-cost ratios are unfavorable. Seven of these allotments would be kept under ephemeral management, and one would continue to be reserved for wildlife habitat.

To implement intensive grazing systems BLM would construct rangeland developments at a cost of $280,000. BLM would implement the proposal over a 6-year period from 1983 to 1989.

The *Proposed Action* would implement numerous other recommendations to benefit a wide range of resources. Major actions would include the following.

- Remove 100 excess wild burros and maintain an average population of 200 burros in the Alamo Herd Manage-

ment Area. Provide burros freedom of movement and access to major waters and ensure that they have adequate forage.

• Remove wild burros from the Big Horn, Granite Wash, Harquahala, and Little Harquahala Mountains to end conflicts with bighorn sheep, protected plants, and private land use and to prevent further damage to sensitive resources.

• Restore deteriorated riparian habitats and improve their condition by fencing, planting broadleaf seedings, implementing rotational grazing systems, designating areas of critical environmental concern (ACECs), and completing other actions recommended by activity plans.

• Protect threatened, endangered, or sensitive plants through fencing, reducing utilization, designating ACECs, and other appropriate measures.

• Provide safe access and year-round water for wildlife at 150 livestock waters.

• Ensure adequate forage for existing big-game populations. As the range produces more forage, increase big-game forage allocations until big game reach desired numbers.

• Reduce livestock-bighorn sheep conflicts in bighorn habitats by lowering utilization, designing proper grazing systems, and separating bighorns from domestic sheep.

• Reduce competition in crucial desert tortoise habitats by seasonally excluding livestock or designing suitable grazing systems.

Levels of Grazing Management

The *Proposed Action* recommends three levels of grazing management; intensive grazing, less intensive grazing, and nonintensive grazing. Existing ephemeral or perennial-ephemeral designations would not change, and one allotment would continue to be reserved for wildlife habitat. Levels of livestock grazing management by allotment for the proposed action are shown in Table 2-1.

TABLE 2-1
PROPOSED GRAZING MANAGEMENT SUMMARY

Intensive Management--All Perennial-Ephemeral (10 Allotments--438,500 Public Acres)	
Aguila	Orosco
Babcock	Pipeline (Existing AMP)
Carco	Santa Maria
Coughlin "A"	Sky Arrow
Loma Linda	Wickenburg "A"

Less Intensive Management--All Perennial-Ephemeral (16 Allotments--398,600 Public Acres)	
Cactus Garden	Los Caballeros
Desert Hills "A"	Moralez
Echeverria	Narramore
Garcia	Palmerita
Hancock	Rees
Harcuvar	Ridgeway Kong
Lamberson	Salome Community
Leidig	Sprouse

Nonintensive Management (53 Allotments--555,900 Public Acres)		
Perennial-Ephemeral		
Auza	Heine	
Bar D 4	Hogue Produce	
Bodfish	James, H.	
Brown, Buck	Jenner	
Cain	Jones	
Calhoun	KMJ	
Carter	Medd	
Carter Herrera	Ohaco	
Central AZ	Park, H.	
Coughlin "B"	Park, R.	
Cross Mountain	Park, R. & E.	
Date Creek	Peters	
Desert Hills "B"	R. Santa Ynez	
Douglas	Saddle Mountain	
Eagle Eye 6Y	Satathite	
Effus	Sitgreaves Red Hill	
Ekvall	Thompson	
Flat Iron	Van Keuren	
Foraker	Vasilius	
Globe	Wellik	
Gordon, R.	Whitehead	
Grantham	Wickenburg "B"	
Hawkins		
Ephemeral		
Alamo	Hassayampa	Turner
Bialac	Primrose	Wilson
Eagle Eye		
Reserved For Wildlife		
White Tanks		

Intensive Grazing Management

Intensive grazing management is proposed for nine allotments involving 408,000 acres of public land. Generally, these allotments produce less than their potential, may have unsatisfactory condition or trend, have good potential for improvement under management, and show a favorable benefit-cost ratio. A tenth allotment (Pipeline), involving 31,000 acres of public land, would continue under its present grazing system. Grazing systems wouuld be developed for each allotment in cooperation with the allottee and other land owners. Government agencies, organizations, and affected interests would also be consulted. Allotment management plans (AMPs) would describe the grazing systems and also specify the numbers and kind of livestock, periods of use, and rangeland developments needed to implement the systems. AMPs would be prepared within 5 years after grazing decisions have been issued. The AMPs would embrace principles of multiple use and sustained yield as outlined in the Lower Gila North MFP.

The following grazing treatments would be used in combination to develop grazing systems for allotments under intensive grazing management:

1. Rest each pasture at least once in both the spring and summer critical growth periods during each 3- or 4-year cycle.

2. Graze each pasture sometimes during every grazing year.

3. Graze no pasture more than twice in the same growing season (spring or summer) during any 3- or 4-year cycle.

4. After the forage in a pasture has been properly utilized, move livestock to the next-best pasture.

These grazing treatments have been designed to improve rangeland forage condition by ensuring rest periods for key forage plants during the critical growth periods. The treatments would increase plant density and improve plant vigor and composition. Moreover, seed dissemination and seedling establishment would stimulate reproduction. Treatments would improve livestock management and production, since cattle would concentrate in the pastures. Periodically moving cattle onto fresh feed would also increase livestock gains (Schmutz and Durfee, 1980). Table 2-2 lists key forage plants that would benefit from these grazing treatments.

TABLE 2-2
KEY SPECIES BENEFITING FROM GRAZING TREATMENTS

Grasses	
Bouteloua curtipendula	Sideoats Grama
Hilaria mutica	Tobosa
Hilaria rigida	Big Galleta
Muhlenbergia porteri	Bush Muhly
Stipa speciosa	Desert Needlegrass
Shrubs and Half Shrubs	
Salazaria mexicana	Mexican Bladdersage
Atriplex canescens	Fourwing Saltbush
Ephedra species	Mormon Tea
Krameria parvifolia	Range Ratany
Krameria garyi	White Ratany
Menodora scoparia	Twinberry
Eriogonum fasciculatum	Flattop Wild Buckwheat

Once intensive management is implemented, an estimated 20 years would be needed to meet the AMP objectives for long-term sustained productivity of forage for livestock, wildlife, burros, and watershed.

Less Intensive Grazing Management

Less intensive grazing management is proposed for 16 allotments containing 399,000 acres of public land. Allotments proposed for less intensive management are in good or fair ecological condition, have a stable or upward apparent trend, and are managed satisfactorily. Stocking rates for these allotments would be held at current levels, based on the 5-year (1976-1980) average licensed use.

Big Galleta

Allotments proposed for less intensive management are not deteriorating and in some cases are improving. Major management changes are not needed except where wildlife conflicts occur, particularly in riparian habitats. Allotments proposed for less intensive grazing management are listed in Table 2-1. Under less intensive management, BLM would not develop specific grazing systems but would specify numbers and kind of livestock, period of use, and rangeland developments for resource management. Low benefit-cost ratios on these allotments do not justify the cost of implementing intensive grazing systems. AMPs, however, would be prepared if resource managers feel they would enhance multiple-use management.

Nonintensive Grazing Management

Nonintensive grazing management is proposed for 53 allotments consisting of 556,000 acres of public land. These allotments have one or more of the following characteristics: (1) ephemeral designation; (2) low potential for vegetation improvement; or (3) small amounts of public land that have been recommended for disposal or where intensive management is impractical. Unfavorable benefit-cost ratios would not support BLM's spending large amounts of money for management unless other critical resources are involved. Initial stocking rates on these allotments would be held at current levels, based on the 5-year (1976-1980) average licensed use. If monitoring reveals significant downward trends in rangeland condition, stocking rates or season of use would be changed. Allotments with extremely low potential for perennial forage production would be monitored to determine if they should be reclassified for ephemeral or seasonal grazing.

Under nonintensive management, BLM would specify numbers and kind of livestock and periods of use. New rangeland developments are not proposed, but existing developments would continue to be used and maintained.

Forage Allocation

The proposed forage allocations are based on recommendations from the Lower Gila North MFP (BLM, 1981c). Forage would be allocated to livestock, big game (mule deer, bighorn sheep, and javelina), and wild burros. (See Table 2-3). Allocations are intended to limit average utilization to 40-60 percent of the key plant species. Rangeland monitoring would measure utilization and provide the basis for further adjustments. Utilization at this moderate level is intended to achieve proper range use, which would reverse downward trends in rangeland condition and maintain desired rangeland condition by achieving the following:

— increasing herbage production (Van Poollen and Lacey, 1979).

— reducing the impacts from drought (Paulsen and Ares, 1961).

— maintaining or improving the health and vigor of key forage plants (Hutchins, 1954).

TABLE 2-3
FORAGE ALLOCATION SUMMARY*

		Proposed Action	No Action	Intensive Grazing	Seasonal Grazing	Ephemeral Option	No Livestock
	Initial						
	Number of Animals	4,088	4,843	4,088	4,088	3,711	0
Livestock Allocation	AUMs	49,051	58,155	49,051	49,051	44,536	0
	Projected**						
	Number of Animals	4,478	4,843	4,598	4,391	3,970	0
	AUMs	53,730	58,155	55,181	52,696	47,651	0
	Initial						
	Number of Animals	3,460	0	3,460	3,460	3,460	3,460
Big-Game Allocation	AUMs	9,574	0	9,574	9,574	9,574	9,574
	Projected**						
	Number of Animals	4,360	0	4,720	4,500	4,500	6,090
	AUMs	11,489	0	12,331	12,179	12,179	15,970
	Initial						
	Number of Animals	210	0	210	210	210	310
Burro Allocation	AUMs	1,260	0	1,260	1,260	1,260	1,860
	Projected**						
	Number of Animals	210	0	210	210	210	310
	AUMs	1,260	0	1,260	1,260	1,260	1,860

* All figures for public land only.
** Projections are for 20 years after implementation.

— providing for establishment and growth of desirable species (Hutchins, 1954)

— maintaining enough vegetation for soil protection (Hutchins, 1954).

Forage is allocated in AUMs. An AUM is 800 pounds of air dry forage or the amount of forage needed to sustain a 1,000 pound cow or its equivalent for 1 month. For this analysis, 1 AUM will support four mule deer, five bighorn sheep, eight javelina, or two wild burros. The remaining vegetation would be used by small game, for nongame food and cover, and for plant maintenance, soil and water protection, and recreation values.

The *Proposed Action* allocates forage on 79 allotments in the EIS area. Livestock would be allocated 49,051 AUMs, a 16 percent reduction from the authorized grazing preference of 58,155 AUMs. Adjustments would vary by allotment from an increase of 305 percent to a decrease of 78 percent. Livestock allocations on 66 allotments would be based on 5-year average licensed use (1976-1980). Since rangeland inventory data reveal that most of the EIS area is in fair condition or better, with an overall static trend, BLM determined that current use levels, as defined by average licensed use, would provide the best starting point for initial stocking rates until monitoring documented utilization of key species. Utilization and other field studies would provide information to backup or refine rangeland inventory data to be used in justifying later increases or decreases in stocking rates. The 5-year average licensed use was selected because it reflects recent grazing levels and conditions while reducing the effect of yearly climatic fluctuations. BLM would place greatest priority on monitoring and supervising those allotments shown by the inventory to have unsatisfactory condition or downward apparent trend. Further livestock reductions to improve condition and trend on these allotments would be expected as soon as BLM gathers the needed field data.

No livestock allocations would be needed on seven ephemeral allotments where livestock grazing is authorized only when annual forage is abundant or on the White Tanks allotment, which is reserved for wildlife. Allocations on the remaining five allotments would be based on grazing preference because average licensed use has been artificially low for legal or financial reasons. BLM would use rangeland monitoring data to evaluate management programs and provide for needed changes for all allotments in the EIS area. Table 2-4 shows the livestock grazing summary for the *Proposed Action* and the four alternatives. Descriptions by allotment are shown in Appendix 5. Big game would be allocated 9,574 AUMs, enough forage to sustain existing big-game numbers. Wild burro numbers would be reduced, and 1,260 AUMs would be annually allocated to maintain an average population of 200 in the Alamo Herd Management Area (HMA) and 10 burros in the Lake Pleasant HMA, which lies mostly outside the EIS area. The remaining 442,213,000 pounds of vegetation would be used for other resources: small and nongame wildlife, watershed protection, recreation, and plant maintenance (Table 2-5).

Supplemental allocations of forage may be made to livestock on perennial-ephemeral allotments during years of abundant ephemeral vegetation caused by above-average rainfall. Ephemeral growth would also be used by wildlife, wild burros, and other resources. BLM cannot predict the frequency, duration, and size of ephemeral growths because rainfall greatly varies from year to year. Ephemeral forage can be allocated only when BLM determines that enough forage exists. Good ephemeral blooms have occurred in 12 out of 30 years from 1951-1981.

Twenty years after implementation, vegetation production would increase to 514,626,000 pounds, allowing an estimated 6,600 additional AUMs of forage to be allocated to grazing animals. This increase would be allocated according to planning objectives and the needs of each resource. Tentatively such increased forage would result in the following allocations: 53,730 AUMs to livestock, 11,489 AUMs to big game, and 1,260 AUMs to burros.

Table 2-5 summarizes initial and projected vegetation allocations for each alternative. Appendix 4 lists initial and projected allocations by allotment.

TABLE 2-4
LIVESTOCK GRAZING SUMMARY*

	Authorized Grazing Preference	Average Licensed Use (1976-1980)	Proposed Action	No Action	Intensive Grazing	Seasonal Grazing	Ephemeral Option	No Livestock
Initial Allocation AUMs	58,155	46,033	49,051	58,155	49,051	49,051	44,536	0
Percent Change From Grazing Preference	NA	NA	-16	0	-16	-16	-23	-100

* All figures for public rangeland only.
NA = Not Applicable.

TABLE 2-5
VEGETATION ALLOCATION SUMMARY
(Vegetation in 000's of Pounds)

	Total	Livestock	Burros	Big Game	Other Resources
PROPOSED ACTION					
Initial	490,120	39,240	1,008	7,659	442,213
Projected*	514,626	42,984	1,008	8,994	461,640
NO ACTION					
Initial	490,120	46,524	0	0	443,596
Projected*	490,120	46,524	0	0	443,596
INTENSIVE GRAZING					
Initial	490,120	39,240	1,008	7,659	442,213
Projected*	519,527	44,145	1,008	9,865	464,509
SEASONAL GRAZING					
Initial	490,120	39,240	1,008	7,659	442,213
Projected*	512,175	42,157	1,008	9,743	459,267
EPHEMERAL OPTION					
Initial	490,120	35,631	1,008	7,659	445,822
Projected*	513,155	38,121	1,008	9,743	464,283
NO LIVESTOCK					
Initial	490,120	0	1,488	7,659	480,973
Projected*	524,428	0	1,488	12,776	510,164

* All projections are for 20 years after implementation.

Rangeland Developments

Construction

The following rangeland developments are proposed to implement intensive grazing management: three spring developments, 2 miles of pipeline, 41 miles of fence, and seven wells. Initial costs for construction would amount to $280,800, and annual maintenance costs would amount to $3,600.

New fences and water developments are needed to control livestock movement, improve the use of key forage species, improve the distribution of livestock, prevent overuse of some areas, and implement intensive grazing systems. The proposed waters would also benefit wildlife by encouraging wider wildlife distribution and improving wildlife habitat in general.

Proposals for rangeland developments would be refined during preparation of AMPs and subject to updated benefit-cost anayses. Sites for rangeland developments would be identified once AMPs are developed. Environmental assessments for specific developments would be prepared before approval to assure that all resources are adequately considered. Table 2-6 summarizes the number and kinds of developments proposed for each alternative. Proposed rangeland developments by allotment are shown in Appendix 8.

Rangeland developments would be authorized by one of two methods: (1) range improvement permit or (2) cooperative agreement. A range improvement permit authorizes a privately owned project (such as a corral) that aids in the handling of livestock and is paid for by the permittee. All developments on public land must meet the same environmental and engineering standards as those constructed by BLM. In a cooperative agreement, BLM may fund all or part of the development, and title remains

PROPOSED ACTION

TABLE 2-6
RANGELAND DEVELOPMENT SUMMARY

	Development Type	Units	Cost $(000)	Acres Disturbed Short Term	Acres Disturbed Long Term
Proposed Action	Reservoir	0	—	0	0
	Spring Development	3	3.6	12.0	4.0
	Well (Equipped)	7	93.1	2.0	0.5
	Pipeline	2	16.0	2.0	0.5
	Fence	41 miles	168.1	21.0	4.0
TOTALS			280.8	37.0	9.0
No Action	Reservoir	0	—	—	—
	Spring Development	0	—	—	—
	Well (Equipped)	0	—	—	—
	Pipeline	0	—	—	—
	Fence	0	—	—	—
TOTALS			0	0	0
Intensive Grazing	Reservoir	21	210.0	31.0	24.0
	Spring Development	10	12.0	3.0	1.0
	Well (Equipped)	38	505.4	10.0	2.0
	Pipeline	10	80.0	10.0	3.0
	Fence	122 miles	500.2	61.0	13.0
TOTALS			1,307.6	115.0	43.0
Seasonal Grazing or (Ephemeral Option)	Reservoir	0	0	0	0
	Spring Development	7	8.4	21.0	7.0
	Well (Equipped)	23	305.9	6.0	1.5
	Pipeline	7	56.0	7.0	1.8
	Fence	0	0	0	0
TOTALS			370.3	34.0	10.3
No Livestock	Fence	1,750 miles	7,175.0	875.0	175.0
	Cattleguard	150	465.0	16.0	16.0
	Gates	115	11.5	0	0
TOTALS			7,651.5	891.0	191.0

with the United States. Cooperative agreements specify maintenance responsibility and division of cost and labor between BLM and the permittee.

Although the Lower Gila North MFP proposes no major land treatments or vegetation manipulations for livestock grazing, it recommends developing a fire management plan in coordination with the rangeland management plan. This plan would identify areas for modified fire suppression, areas for intensive control, and areas where controlled burning would benefit rangeland resources.

Maintenance

Under recent BLM policy, permittees will maintain structural developments, such as fences, wells, troughs, springs, reservoirs, pipelines, and cattleguards installed primarily to benefit livestock grazing. Through agreement, permittees may also maintain nonstructural developments such as seedings, brush control, or prescribed burns. BLM will maintain nonstructural developments not assigned to permittees and will pay for reconstruction of developments.

Developments installed primarily to benefit resources other than livestock will be maintained by BLM or nonlivestock cooperators through agreement. Maintenance responsibility for livestock improvements will be made part of the terms of the permit or lease.

Implementation

After the final EIS has been filed and a rangeland program summary has been prepared, BLM would begin thorough consultation with livestock operators, affected land owners, federal, state, and local agencies, and other organizations involved in rangeland management. During this period, BLM would examine inventory data, planning recommendations, and public comments on resource management in the area. Site-specific needs would be identified by allotment, including recommended studies, rangeland developments, types of grazing systems, and measures to restore riparian habitats. During consultation, if new information is presented that warrants adjustments, initial stocking levels and numbers or kinds of planned developments would be changed. Grazing systems would be developed in cooperation with the grazing operators and other key parties and would be documented in AMPs. Grazing systems would be designed to consider present grazing practices, the condition of each allotment, rangeland management objectives, and the long-term needs of affected resources. Changes made to the rangeland program during the consultation phase would be documented in periodic updates to the rangeland program summary and subjected to a benefit-cost analysis.

After the filing of the final EIS, BLM would set up a burro capture program with allottees whose allotments lie within the herd management areas. BLM would prepare a burro capture plan in consultation with appropriate government agencies and interest groups. Details for the burro capture program would be outlined in a herd management area plan for each area.

Intensive grazing management would be implemented within 5 years after individual grazing decisions have become final. BLM would begin preparation of five AMPs during the first year after grazing decisions are issued and would begin preparation of the remaining four during the second year. Development would be completed within the 5-year period. Implementation priorities would depend on funding, resource conflicts, and cooperation from allottees.

Livestock numbers would be adjusted at the beginning of the second grazing season after completion of the final EIS. Where livestock are reduced, the difference between the authorized grazing preference and the proposed allocation would be suspended. Suspended grazing preference would be restored until forage production increases and is allocated for livestock grazing on a sustained yield basis. Where BLM determines reductions would cause severe hardship to livestock operators, the reduction could be implemented over a 5-year period. The first reduction would be taken on the effective date of the decision at a level sufficient to generate an improvement in vegetation. The balance would be taken in the third and fifth years. Before implementing each step of a phased reduction, BLM would review rangeland data from monitorinng and other sources to determine whether the amount of reduction should be increased or decreased. If an adjustment is warranted, a new decision would be issued, although the phase-in period would remain unchanged.

Rangeland Developments Are Needed For Grazing Management

Properly located and well-maintained developments are essential for good livestock management on public lands. BLM cooperates with livestock operators in building and maintaining such developments. Different numbers and types of developments are proposed in the grazing alternatives analyzed in the EIS.

Once wild burros are at proposed levels, excess burros would be captured every third year as funds are provided to maintain proposed numbers. Where complete burro removal is proposed, BLM would set up a capture program in cooperation with affected permittees to remove burros every year until the program is complete.

The *Proposed Action's* goal is to attain specific management objectives within 20 years of implementation.

Monitoring Program

BLM would monitor the grazing management program to determine the effectiveness of grazing treatments and new rangeland developments and to determine whether AMP objectives are being met. Monitoring would provide information critical to managing and refining the program and provide the basis for making needed adjustments.

In developing and implementing rangeland monitoring, BLM would classify allotments by similar characteristics and needed management actions. Priorities for monitoring would be based on the current condition and long-term potential of rangeland resources and on the proposed level of grazing management. Monitoring techniques would be cost effective, simple, and reliable. A rangeland inventory, showing rangeland and riparian habitat condition and trend, would be maintained and updated. Rangeland inventory data would be maintained to provide a baseline for monitoring. BLM would continue to consult with the livestock operators and affected parties throughout the monitoring program.

A broad rangeland monitoring plan is now being developed for the EIS area, outlining studies to be conducted for each allotment. Detailed monitoring plans would be developed for each allotment and described in an AMP or allotment file if an AMP is not prepared. BLM would coordinate monitoring plans with affected interests, universities, and federal and state agencies.

At a minimum, the monitoring studies would include actual yearly livestock use, forage utilization, trend in rangeland condition, and precipitation. BLM would start these studies before implementing other portions of the *Proposed Action,* except for initial adjustments in livestock numbers. Actual use figures from livestock operators are the foundation for grazing management adjustments, since utilization, condition and trend, and production have little value unless the grazing use is known. Each year specialists would study utilization, using the key forage plant method (an ocular estimate) or grazed class photo guides on one or more key forage plants. Rangeland specialists would also evaluate condition and trend studies at the end of each grazing treatment cycle to determine if condition is improving, declining, or stable. Trend would be measured using plant frequency and cover data and correlated to rangeland condition. To measure yearly changes in rainfall, BLM would install rain gauges in key locations throughout the EIS area. Such information is important because the amount of precipitation greatly affects vegetation production and plant vigor and thus biases trend data. BLM would also design studies to ensure that wildlife management objectives are being met.

In developing the rangeland monitoring plan, specialists in a wide range of resource fields would identify resource conflicts and assess the potential for improvement, particularly in riparian habitat. This information would be used to define the monitoring needs and procedures on an allotment basis and would be documented in the monitoring plan. BLM would consider proposals to conduct cooperative studies with universities, government agencies, and other affected interests. Such studies could lead to refining management programs or to new actions to protect and enhance the riparian resource. Special emphasis would be placed on monitoring 11,100 acres of riparian habitat along the Bill Williams, Santa Maria, and Hassayampa Rivers. Wild burros in the Alamo Herd Management Area would be monitored to determine herd condition and population trends. Studies would provide the basis for increasing or decreasing burro numbers to maintain viable populations in harmony with their habitat.

Where monitoring finds the objectives are not being met, grazing systems would be modified, livestock numbers or kind of livestock changed, or additional rangeland developments built to reach the objectives. In some instances, rangeland management objectives may need to be reevaluated. Where monitoring shows a sustained increase in forage production, additional forage would be allocated to meet increased requirements for grazing animals in accordance with planning recommendations.

The following example shows how monitoring data could be used for calculating stocking rate adjustments.

	Allotment A	*Allotment B*
Climate	Normal precipitation	Normal precipitation
Trend	Cover down 5% Key Species down 5%	Cover up 10% Key species up 5%
Utilization	80%	35%
Actual Use	600 AUMs/Year	400 AUMs/Year

Allotment A shows a downward trend, indicating that numbers must be adjusted to reduce utilization. Following is the formula (BLM Manual 4413.3) used to calculate the adjusted stocking rate necessary to achieve a desired level of utilization:

$$\frac{600 \text{ AUMs}}{80\%} = \frac{x}{50\%} \qquad x = 375 \text{ AUMs}$$

Allotment B shows an upward trend, permitting an increase in stocking rate up to 50 percent utilization. The formula is used to determine the adjustment.

$$\frac{400 \text{ AUMs}}{35\%} = \frac{x}{50\%} \qquad x = 571 \text{ AUMs}$$

Within the EIS area, ephemeral blooms greatly influence utilization of key perennial forage, resulting in low utilization when ephemeral forage is abundant and high utilization when ephemeral forage is scarce. The above formula must therefore be applied with discretion. To mitigate the effects of fluctuating ephemeral growths, stocking increases or decreases would generally be held to a maximum of 15 percent in any one year, consistent with regulations, as a result of information gathered from utilization studies.

Monitoring Would Play Key Role In Rangeland Program

BLM range specialists would monitor the impacts of grazing management on vegetation under most of the alternatives addressed in the EIS. Studies would provide important data on which BLM would base decisions to adjust grazing use or management.

Administration

BLM offers each livestock operator a 10-year permit, which states numbers and kind of livestock and period of use for each allotment. If an AMP is prepared, it is included in the terms and conditions of the permit.

Each AMP would identify the flexibility in livestock numbers and movement dates that the permittee could exercise without prior BLM approval. The flexibility would allow the permittee to vary livestock numbers in each allotment or pasture as long as actual use does not exceed the proposed allocation levels shown in Appendix 4. Normal flexibility allows the operator to adjust to climatic fluctuations such as high or low production, to availability of water, to early or late rangeland readiness, and to variations in ranching operations.

BLM would supervise livestock grazing throughout the year. To change grazing use from that authorized by the grazing permit, the operator would have to submit a written request to BLM before the grazing period begins.

For ephemeral allotments, an annual application by qualified permittees is not required unless grazing use is desired. On a year-to-year basis, whenever forage exists or climatic conditions indicate the probability of an ephemeral forage crop, livestock grazing would be authorized upon application, subject to management requirements for the allotment. BLM would require ephemeral allotments to be rested from June 15 to October 1 every year and would reserve sufficient ephemeral forage to meet the needs of wildlife, wild burros, an other resources.

For perennial-ephemeral allotments, authorizations for ephemeral forage grazing would be issued to qualified applicants only after such forage is assured. Additional use would be granted on a nonrewardable basis only after full consideration of conditions, and if the use would not conflict with management objectives and the perennial vegetation would not be damaged. Supplemental licenses for ephemeral grazing would generally be issued for at least 30 days and only where overall rangeland condition is fair or better. Ephemeral grazing would not be authorized in rested pastures on intensive allotments.

Unauthorized livestock use of public rangelands constitutes trespass. Should trespass be discovered, BLM would have the trespassing livestock removed and require the operators responsible for the trespass to pay for the forage consumed and damages incurred. Ear tags may be used to help deter chronic trespass.

Significant changes to the proposed authorized use (including change in kind of livestock) would require preparing an environmental assessment. In addition, BLM would adjust the rangeland management program as needed during drought or other emergencies. Such changes would be designed to meet rangeland management objectives.

Implementing the *Proposed Action* would require 50 workmonths per year above fiscal year 1982 funding. Administration and monitoring would require 24 additional workmonths per year after implementation.

Measures for Resource Protection and Enhancement

BLM policy requires the use of standard protective measures in implementing its rangeland program to reduce or eliminate adverse environmental impacts and enhance resources. The following measures apply to all developments built in the EIS area and include other MFP recommendations that would affect the grazing program.

1. An interdisciplinary team of resource specialists will review all rangeland development proposals to ensure the greatest multiple-use benefits.

2. All proposals will be evaluated in an environmental study of appropriate scope to determine site-specific impacts. At the least, studies will address cultural resources, protected plants and animals, visual resources, and wilderness values. If needed, additional mitigating measures will be developed to reduce or eliminate site-specific impacts.

3. Before surface-disturbing projects are approved, a cultural resource evaluation will be completed, including intensive field inventories (Class III) of potential impact areas (BLM Manual 8111.14). If any historic or archaeological properties are found, their eligibility for inclusion in the National Register of Historic Places will be determined in consultation with the Arizona State Historic Preservation Officer (SHPO) (36 CFR 1204). Whenever feasible BLM will avoid impacts to cultural resources by redesigning or relocating the project. If impacts are unavoidable, BLM will consult with the SHPO to develop mitigation to reduce or eliminate adverse impacts to cultural resources. The consultation will follow procedures outlined in the Programmatic Memorandum of Agreement of January 14, 1980 (Appendix 13). Cultural resource mitigation will be completed before project constuction begins. If buried cultural remains are found during construction, the construction will stop and BLM will be notified. These measures will ensure compliance with the Antiquities Act of 1966, the national Environmental Policy Act of 1969, and Executive Order 11593.

4. Before construction, BLM will conduct a site evaluation for state-protected and BLM sensitive plants. Where possible, projects will be located to avoid impacts to large numbers of protected plants or their habitat. Where impacts would be unacceptable, plants will be salvaged or transplanted. or the project will be abandoned. BLM will notify the ArizonaCommission of Agriculture and Horticulture 30 days in advance of actions that would affect plants protected under the Arizona Native Plant law.

5. Before installing facilities, BLM will conduct a site evaluation for state-protected and BLM sensitive animals and will develop mitigation to protect these species and their habitats. Such mitigation might include project relocation, redesign, or abandonment.

6. If a project is proposed within the habitat of a threatened or endangered species, BLM will consult with the U.S. Fish and Wildlife Service in accordance with the Endangered Species Act of 1973, as amended, and take appropriate action.

7. BLM will complete contrast ratings for all proposed rangeland developments and recommend mitigating measures to ensure that visual resource management class objectives are met.

8. Rangeland developments will conform to the purpose for which scenic, recreation, and area of critical environmental concern designations are recommended in the Lower Gila North MFP. Care will be taken to avoid adverse impacts on the potential of public lands being considered for natural area or national landmark designation by other federal or state agencies.

9. All rangeland management activities proposed for lands under wilderness review will meet the nonimpairment standard according to BLM's *Interim Management Policy and Guidelines for Land Under Wilderness Review* (BLM, 1979b). If the project does not meet the nonimpairment standard, it will be redesigned, moved outside the study area, cancelled upon wilderness designation, or delayed until the area is dropped from further wilderness consideration. Should public lands within the EIS area be designated wilderness, BLM would conform its grazing management on those lands to the provisions of BLM's Wilderness Management Policy. Specific guidelines in the *Interim Management Policy* for rangeland management on lands that remain under wilderness review have been placed in Appendix 14. Nonimpairment criteria have been reproduced in Appendix 15.

10. During construction of rangeland developments, vehicles will use existing roads and trails wherever possible for access to sites. Where feasible and where no roads exist, vehicles will travel cross-country to avoid the need for road building. Where new roads must be built, roadbeds will be no wider than needed for reliable access; BLM specifications will also be used to reduce erosion and gullying.

11. During construction of all rangeland developments, surface resources will be disturbed as little as possible.

After construction, disturbed surfaces will be restored to a natural condition as far as is practicable.

12. Fences proposed in big-game habitat will be designed to reduce adverse impacts to big-game movement. Specifications in BLM Manual 1737 and in local BLM directives will be used. BLM will consult with the Arizona Game and Fish Department on the design and location of new fences.

13. Where existing fences in big-game habitat do not meet BLM specifications, they will be modified according to BLM Manual 1737 when they are scheduled for replaceent or major maintenance.

14. As a general practice, new roads will not be bladed for use in fence construction. Vehicles will travel overland, or fences will be built by hand.

15. All livestock waters will provide safe, usable water for wildlife. As funding and opportunities permit, existing facilities will be modified for safe wildlife use. The following standards apply to design and modification of livestock waters.

• The above-ground height of livestock troughs and tanks will not exceed 20 inches. BLM will install wildlife escape ladders in each facility and provide ramps for small bird and mammal access. Storage tanks will have either a metal or floating vinyl cover to reduce evaporation and prevent wildlife from drowning.

• Ground-level wildlife water developments will be established on livestock waters where feasible. An exclosure of 3 to 7 acres containing the water source, storage, and related riparian habitat will be built to exclude livestock. Where terrain permits, livestock water will be provided at least 0.25 miles outside of the fenced exclosure.

• Developed springs, related storage, and adjacent riparian habitat will be fenced to exclude livestock.

• Where practical, water troughs and tanks will be kept full year round to provide a continuous water supply for wildlife.

16. BLM will include the following actions into its rangeland management program to benefit the habitat of big game or special-status animals as recommended in the Lower Gila North MFP.

• To improve big-game habitat in dry, mountainous areas, BLM will develop 20 water facilities in cooperation with the Arizona Game and Fish Department.

• To reduce competition for cover, water, and space among big game, livestock, and wild burros, livestock concentrations will be reduced and wild burros removed in the Big Horn, Granite Wash, and Harquahala Mountains.

• Bighorn sheep lambing areas will be protected by (1) restricting livestock grazing from January through May, (2) holding average utilization of key browse species to 40 percent or less, and (3) prohibiting fence construction and other disturbances within the areas.

• Bighorn sheep habitat will be enhanced by (1) decreasing cattle densities where monitoring finds livestock and bighorns competing for space, water, and browse, (2) removing wild burros from the Big Horn, Granite Wash, Harquahala, and Little Harquahala Mountains, (3) separating domestic sheep from bighorn habitat to reduce transmittable disease, and (4) allocating forage and providing other coordination needed for the Arizona Game and Fish Department to reintroduce bighorn sheep into the Black and Weaver Mountains.

• To protect or enhance important nesting areas, (1) four reservoirs will be fenced to exclude livestock and wild burros, and water will be siphoned outside the exclosures, and (2) construction or disturbance will be reduced next to significant cliffs in the Big Horn and Vulture Mountains.

• Herbaceous forage production and its use by desert tortoises in conflict areas will be increased by (1) building pastures around tortoise populations and resting those pastures from livestock use between February and July, (2) reaching a good rangeland condition in heavily populated desert tortoise areas, and (3) excluding domestic sheep from crucial tortoise areas in the Ohaco allotment from February 1 to June 30. These measures will be implemented through habitat management plans, allotment management plans, and rangeland management practices affecting 15 allotments.

• The quality of open chaparral standard habitat sites in the Harcuvar and Harquahala Mountains will be improved by (1) incorporating these habitats into separate grazing pastures to control season and intensity of livestock use and (2) developing a prescribed burn plan to improve herbaceous cover over 8,500 acres.

17. BLM will incorporate the following actions into its rangeland program to enhance the management of healthy, viable wild burro populations in designated herd management areas (HMAs).

• Maintain free access for wild burros to Alamo Lake and livestock-watering facilities in the Alamo HMA. Ensure that new structures do not impede burro movement.

• Designate a wild burro viewing route within the Alamo HMA, providing interpretive signing as funding permits, to enhance public awareness and appreciation of wild burros on the public lands.

18. As recommended by the MFP, BLM will include the following actions in its rangeland management program to benefit significant botanical resources.

• Fenced exclosures will be built aound four populations of *Allium bigelovii* and *Mammillaria viridiflora,* totaliing 35 to 50 acres, to protect sensitive plants from livestock and burro trampling and browsing and from other disturbances.

• Grazing systems on the north slopes of the Harquahala Mountains will be designed to maintain the

Grazing Programs Provide Multiple-use Benefits

Small-game habitat would benefit from new water sources in the desert under some of the grazing management alternatives. Here, a small-game guzzler has been placed near good wildlife cover and away from disturbed areas around cattle troughs. Quail, mourning doves, and white-wing doves regularly use this water source on the Pipeline allotment.

pristine condition of vegetation on 7,000 acres of public land.

• Intensive livestock use will be controlled, and no developments will be built in six significant botanical areas involving 8,800 acres of public land in Peoples Canyon, Grapevine Springs, Arrastr Creek, Antelope Creek, Weaver Creek, and the Harquahala Mountains.

19. BLM will incorporate the following actions into its rangeland management program to protect and restore significant riparian resources and habitats on public lands as recommended in the MFP.

• Develop and implement plans for ensuring the legal availability of water and maintenance of adequate flows in springs on public lands on Arrastre Creek, Antelope Creek, Weaver Creek, and Harquahala Mountain. Such action will ensure viability of dependent riparian communities.

• Establish broadleaf tree reproduction around five significant springs and on 2,500 acres of suitable riparian habitat through supplemental planting of seedlings and protection from grazing animals. These habitats support many state-listed and BLM sensitive animal species.

• Develop allotment management plans or rangeland management practices on six allotments and habitat management plans on six others to control season and intensity of grazing in important riparian areas. Plans and practices will consider measures such as (1) separate pastures on riparian and aquatic standard habitat sites, (2) use of cottonwood and willow as key species, (3) buffer zones, (4) linking grazing intensity to condition of the vegetation, and (5) rest from grazing during the crucial growing season of April 15 to September 30.

• Protect 11,100 acres of riparian habitat and 25 miles of aquatic habitat in the Bill Williams, Santa Maria, Hassayampa, and Centennial Wash drainages from impacts of construction, burro overgrazing, utilization of key plants exceeding 40 percent, and utilization of cottonwoods and willows exceeding 20 percent. Specific meassures will be developed and implemented through allotment management plans, habitat management plans, and rangeland management practices on 12 allotments.

• Incorporate the upper Centennial Wash wetlands, including three dikes and 6,000 acres, into a separate grazing pasture to allow special management needed to improve the

condition class to good or better and to enhance its aquatic habitat value.

• Promote recovery of deteriorated riparian vegetation by building a 2-acre exclosure on a portion of upper Weaver Creek.

20. BLM will designate as areas of critical environmental concern (ACECs) 9,500 acres of public land along the Bill Williams and Santa Maria Rivers, Arrastre and Antelope creeks, Peoples Canyon, and Grapevine Springs. The designations will be used to focus management concern on significant riparian habitats in unsatisfactory condition or vulnerable to rapid deterioration. ACEC plans will be prepared to outline management actions needed to restore the areas to satisfactory conditions and to stabilize or enhance numerous populations of sensitive and protected animals dependent on these habitats.

21. BLM will develop a fire management program for key areas within the planning area. Objectives will be to maintain desired plant communities, open stagnant chaparral, recycle nutrients, and prepare seedbeds. Fire management plans will identify prescribed burn areas, modified suppression areas, intensive control areas, and rehabilitation measures.

CONTINUATION OF PRESENT GRAZING MANAGEMENT (NO ACTION)

Overview

The *No Action* alternative proposes no change in present grazing management. It is addressed in accordance with BLM policy and Council on Environmental Quality regulations. Livestock levels would remain at authorized grazing preferences, and no forage would be allocated to wild burros or big game. No additional grazing systems would be developed.

Levels of Grazing Management

Under *No Action,* yearlong livestock grazing would continue on 1,064,300 acres of public land on 35 allotments. No new intensive grazing systems would be developed. Custodial grazing would continue on 35 allotments involving 108,400 acres of public land. Ephemeral grazing would continue on seven allotments containing 171,100 acres of federal land. The White Tanks allotment would continue to be reserved for wildlife, and the Pipeline allotmeent would continue to be managed under the existing AMP. Table 2-7 shows present levels of grazing management by allotment, which would continue under *No Action.*

TABLE 2-7
PRESENT GRAZING MANAGEMENT SUMMARY

Yearlong Grazing (35 Allotments--1,064,300 Public Acres)	
Aguila	Leidig
Babcock	Loma Linda
Cactus Garden	Los Caballeros
Calhoun	Moralez
Carco	Narramore
Carter Herrera	Ohaco
Coughlin "A"	Orosco
Desert Hills "A"	Palmerita
Douglas	Rees
Eagle Eye 6Y	Ridgeway Kong
Echeverria	Saddle Mountain
Effus	Salome Community
Flat Iron	Santa Maria
Garcia	Sitgreaves Red Hill
Hancock	Sky Arrow
Harcuvar	Sprouse
Jones	Wickenburg "A"
Lamberson	

Intensive Management (1 Allotment--31,000 Public Acres)
Pipeline (Existing AMP)

Custodial (35 Allotments--108,400 Public Acres)	
Auza	Hogue Produce
Bar D 4	James, H.
Bodfish	Jenner
Brown, Buck	KMJ
Cain	Medd
Carter	Park, H.
Central AZ	Park, R.
Coughlin "B"	Park, R. & E.
Cross Mountain	Peters
Date Creek	R. Santa Ynez
Desert Hills "B"	Satathite
Ekvall	Thompson
Foraker	Van Keuren
Globe	Vasilius
Gordon, R.	Wellik
Grantham	Whitehead
Hawkins	Wickenburg "B"
Heine	

Ephemeral (7 Allotments--171,100 Public Acres)		
Alamo	Hassayampa	Turner
Bialac	Primrose	Wilson
Eagle Eye		

Reserved For Wildlife (1 Allotment--18,200 Public Acres)
White Tanks

Forage Allocation

Livestock grazing would remain at the authorized grazing preference of 58,155 AUMs as shown in Table 2-3. Neither big game nor wild burros would be allocated forage, although existing numbers of big game and wild burros would continue to use forage to satisfy their dietary needs. BLM would hold wild burro populations to numbers estimated to exist at the time of implementation (610). A total of 443,596,000 pounds of vegetation would remain for uses other than livestock. If requested, supplemental licenses could be issued for livestock grazing when ephemeral forage exists and ephemeral grazing does not conflict with other resources

After 20 years, livestock allocations would remain at 58,155 AUMs. No forage would be allocated to big game and wild burros. Wild burro populations would remain at 610.

Rangeland Developments

BLM would construct no new rangeland developments for livestock grazing management, but existing developments would continue to be maintained. Operator-built developments would be authorized on a case-by-case basis through cooperative agreements or range improvement permits where needed for the orderly use of the rangeland.

Implementation

The *No Action* alternative would require no implementation for livestock grazing, since existing grazing management would continue. Upon completion of the final EIS, BLM would rewrite the Alamo Herd Management Area Plan and prepare other plans for a burro capture program. The plans would be designed to maintain 610 burros in four herd management areas. Thereafter excess wild burros would be removed periodically as funding is provided.

Monitoring and Administration

All allotments would be administered through procedures described for the *Proposed Action*. BLM specialists would periodically inspect allotments and monitor for trespass. Workmonth requirements would remain at existing levels.

Measures for Resource Protection and Enhancement

Measures 1 through 15 listed under the *Proposed Action* are standard operating procedures and would apply to the *No Action* alternative. The remaining measures are taken from MFP recommendations and would not be implemented under this alternative.

INTENSIVE GRAZING MANAGEMENT (INTENSIVE GRAZING)

Overview

This alternative would implement intensive grazing management on all allotments not now managed under ephemeral or custodial grazing. Its purpose would be to generate greater and more rapid increases in forage production and improve rangeland condition throughout the EIS area. Grazing permittees would play a significant role in developing the grazing systems and would incur a greater share of the costs of building and maintaining rangeland developments

Other elements of the program, including grazing systems, initial stocking rates, forage allocations to big game and wild burros, resource protection, and implementaion schedules would be the same as those under the *Proposed Action*.

Levels of Grazing Management

The *Intensive Grazing* alternative recommends two levels of grazing management: intensive and nonintensive. No changes are proposed in existing ephemeral or perennial-ephemeral designations. One allotment would continue to be reserved for wildlife. Proposed levels of livestock grazing management by allotment are shown in Table 2-8.

Intensive Grazing Management

BLM would implement intensive grazing management on 35 allotments involving 1,064,300 acres of public land and continue intensive management on the Pipeline allotment (31,000 public acres) under its existing AMP. Specific grazing systems would be developed in consultation with the affected livestock operators, the Arizona State Land Department, interest groups, and other government agencies. Treatments for grazing systems would be the same as those outlined in the *Proposed Action* and would be described in AMPs.

Intensively managed allotments are expected to show greater increases in forage production and improved rangeland condition than would occur under other management levels. Unfavorable benefit-cost ratios on some allotments, however, would hinder government funding of rangeland developments needed to implement the grazing

systems. By sharing development costs with the operator, BLM could take advatage of the operators' lower labor and construction costs to improve benefit-cost ratios. Because of the joint funding by BLM and the affected operators, implementing this alternative would require the approval of individual livestock operators. Objectives and goals for the *Intensive Grazing* alternative would be the same as those for the *Proposed Action* as would procedures for authorizing ephemeral grazing on these allotments.

TABLE 2-8
INTENSIVE GRAZING MANAGEMENT SUMMARY

Intensive Management--All Perennial-Ephemeral (36 Allotments--1,095,300 Public Acres)	
Aguila	Leidig
Babcock	Loma Linda
Cactus Garden	Los Caballeros
Calhoun	Moralez
Carco	Narramore
Carter Herrera	Ohaco
Coughlin "A"	Orosco
Desert Hills "A"	Palmerita
Douglas	Pipeline (Existing AMP)
Eagle Eye 6Y	Rees
Echeverria	Ridgeway Kong
Effus	Saddle Mountain
Flat Iron	Salome Community
Garcia	Santa Maria
Hancock	Sitgreaves Red Hill
Harcuvar	Sky Arrow
Jones	Sprouse
Lamberson	Wickenburg "A"

Nonintensive Management (43 Allotments--297,700 Public Acres)		
Perennial-Ephemeral		
Auza		Hogue Produce
Bar D 4		James, H.
Bodfish		Jenner
Brown, Buck		KMJ
Cain		Medd
Carter		Park, H.
Central AZ		Park, R.
Coughlin "B"		Park, R. & E.
Cross Mountain		Peters
Date Creek		R. Santa Ynez
Desert Hills "B"		Satathite
Ekvall		Thompson
Foraker		Van Keuren
Globe		Vasilius
Gordon, R.		Wellik
Grantham		Whitehead
Hawkins		Wickenburg "B"
Heine		
Ephemeral		
Alamo	Hassayampa	Turner
Bialac	Primrose	Wilson
Eagle Eye		
Reserved For Wildlife		
White Tanks		

Nonintensive Grazing Management

Nonintensive grazing management is proposed for 43 allotments involving 297,700 acres of public land. Allotments in this category have either (1) an ephemeral designation or (2) small amounts of public land. BLM cannot justify spending large sums of money to manage these allotments unless critical resources are threatened. BLM would continue to issue licenses for ephemeral allotments when ephemeral forage is found to be adequate and grazing would not conflict with other resources. Under nonintensive management, BLM would specify only numbers and kind of livestock but would monitor these allotments to determine resource conditions and compliance with grazing permits. Where monitoring shows deteriorating rangeland condition, livestock numbers would be reduced, or public lands might be fenced for resource protection. No new rangeland development are proposed for nonintensively managed allotments, but existing developments would continue to be maintained.

Forage Allocation

The *Intensive Grazing* alternative would allocate forage to livestock, big game, and wild burros on 79 allotments. Initial livestock forage allocations would be based on average licensed use during the past 5 years as under the *Proposed Action*. Overall, AUMs of forage would be reduced by 16 percent from the authorized grazing preference of 58,155 AUMs, but adjustments for allotments would vary from increases of 305 percent to reductions of 78 percent. BLM would adjust livestock stocking rates as needed to ensure an average utilization of key species between 40 and 60 percent. Tabe 2-4 shows the livestock grazing summary for the *Proposed Action* and alternatives. Descriptions by allotment are shown in Appendix 5.

Big game would be allocated 9,574 AUMs to sustain existing populations. Wild burro numbers would be reduced, and 1,260 AUMs would be allocated to maintain an average burro population of 210. A total of 442,213,000 pounds of vegetation would remain for other resource uses.

Twenty years after implementing the *Intensive Grazing* alternative, forage production would have improved so that 8,700 additional AUMs of forage could be allocated to grazing aimals. Table 2-3 summarizes initial and projected allocations for each alternative. Appendix 4 describes allocations by allotment for livestock, big game, and wild burros.

Rangeland Developments

The following rangeland developments would be needed to implement *Intensive Grazing:* 10 spring developments, 10 miles of pipeline, 122 miles of fence, 21 reservoirs, and

38 wells. Total construction costs would amount to $1,307,600, and annual maintenance costs would amount to $28,170.

Table 2-6 summarizes the numbers, kinds, and costs of rangeland developments proposed for each alternative. Proposed rangeland developments by allotment are shown in Appendix 8.

Procedures for authorizing and maintaining rangeland developments would be the same as those under the *Proposed Action*.

Implementation

BLM would implement the *Intensive Grazing* alternative as it would the *Proposed Action* except that seven AMPs would be written each year for 5 years. Total AMPs developed would depend on livestock operator cooperation and funds provided for rangeland developments. Livestock adjustments, burro capture programs, and grazing treatments would be similar to those under the *Proposed Action*. The priority for implementing AMPs would be based on (1) potential for rangeland improvement, (2) economic return on investment, (3) impacts on existing ranching operations, and (4) other resource requirements.

Rangeland monitoring, including trend in rangeland condition, actual use, and climate, would also be initiated as under the *Proposed Action*.

Monitoring and Administration

Under *Intensive Grazing*, rangeland monitoring would be similar to that under the *Proposed Action*, including monitoring techniques and consultation requirements. Objectives for monitoring AMPs would also remain unchanged. The livestock grazing program would be administered as under the *Proposed Action*.

To implement *Intensive Grazing*, 90 workmonths per year would be needed beyond fiscal year 1982 funding levels. Administration and monitoring would require 40 workmonths more per year after implementation.

Measures for Resource Protection and Enhancement

All measures listed under the *Proposed Action* would apply to the *Intensive Grazing* alternative.

SEASONAL GRAZING MANAGEMENT (SEASONAL GRAZING)

Overview

This alternative proposes to implement seasonal livestock grazing from October 15 to June 1 on all allotments not presently managed under intensive, custodial, or ephemeral grazing. It is designed to allow yearly rest of key plant species to increase forage production and improve rangeland condition while maintaining favorable benefit-cost ratios.

As a subalternative, eight allotments with low potential for perennial forage production would be classified and managed for ephemeral livestock grazing. Authorized grazing preferences would be canceled on these allotments, and livestock grazing would be authorized only when ephemeral forage is adequate.

Other elements of the grazing program, including initial stocking rates, allocations to big game and wild burros, resource protection, and implementation schedules, would be the same as under the *Proposed Action*.

Levels of Grazing Management

The *Seasonal Grazing* alternative would authorize livestock grazing on public lands on 35 allotments from approximately October 15 to June 1 every year. Seasonal grazing would provide yearly rest for key forage plants for increased production, improved vigor, and reproduction. Overall rangeland condition would improve, and favorable benefit-cost ratios would be maintained. All existing custodial allotments would be placed under nonintensive grazing management, as would the allotments designated for ephemeral grazing. The Pipeline allotment would continue to be managed intensively under the existing AMP. Table 2-9 summarizes the levels of grazing management under this alternative by allotment.

As a subalternative, eight allotments with yearlong grazing privileges would be designated for ephemeral grazing only and placed in the nonintensive management category. The rangeland inventory data showed that these eight allotments have low potential for perennial forage production and might be better managed through ephemeral grazing. Authorized grazing preferences on these allotments would be canceled within 3 to 5 years to allow the livestock operators to adjust their operations as needed. Table 2-10 summarizes levels of grazing management under the ephemeral option.

TABLE 2-9
SEASONAL GRAZING MANAGEMENT SUMMARY

Seasonal Management--All Perennial-Ephemeral (35 Allotments--1,064,300 Public Acres)	
Aguila	Leidig
Babcock	Loma Linda
Cactus Garden	Los Caballeros
Calhoun	Moralez
Carco	Narramore
Carter Herrera	Ohaco
Coughlin "A"	Orosco
Desert Hills "A"	Palmerita
Douglas	Rees
Eagle Eye 6Y	Ridgeway Kong
Echeverria	Saddle Mountain
Effus	Salome Community
Flat Iron	Santa Maria
Garcia	Sitgreaves Red Hill
Hancock	Sky Arrow
Harcuvar	Sprouse
Jones	Wickenburg "A"
Lamberson	

Intensive Management--All Perennial-Ephemeral (1 Allotment--31,000 Public Acres)
Pipeline (Existing AMP)

Nonintensive Management (43 Allotments--297,700 Public Acres)	
Perennial-Ephemeral	
Auza	Hogue Produce
Bar D 4	James, H.
Bodfish	Jenner
Brown, Buck	KMJ
Cain	Medd
Carter	Park, H.
Central AZ	Park, R.
Coughlin "B"	Park, R. & E.
Cross Mountain	Peters
Date Creek	R. Santa Ynez
Desert Hills "B"	Satathite
Ekvall	Thompson
Foraker	Van Keuren
Globe	Vasilius
Gordon, R.	Wellik
Grantham	Whitehead
Hawkins	Wickenburg "B"
Heine	
Ephemeral	
Alamo	Hassayampa
Bialac	Primrose
Eagle Eye	
Turner	
Wilson	
Reserved For Wildlife	
White Tanks	

Forage Allocation

Under *Seasonal Grazing,* initial forage allocation for livestock, big game, and wild burros would be the same as under the *Proposed Action.* Ephemeral designations would reduce the overall forage allocation to livestock by 4,515 AUMs under the ephemeral option. Table 2-3 shows the initial and projected allocations for the *Seasonal Grazing* alternative and the ephemeral option.

Twenty years after implementation, projected forage increases would permit BLM to allocate 6,300 more AUMs to meet increased requirements for grazing animals in accordance with planning objectives.

Rangeland Developments

Existing developments would be maintained. BLM would build new developments and authorize operator-built developments where needed for better livestock distribution or sensitive resource protection. Favorable benefit-cost ratios would allow the following rangeland developments to be built to implement this alternative: 7 spring developments, 23 wells, and 7 pipelines. Table 2-6 summarizes the numbers, kinds, and costs of rangeland developments for each alternative. Rangeland developments proposed for each allotment are described in Appendix 8. The initial cost for construction would amount to $370,300, and annual maintenance costs would amount to $5,800.

Procedures for authorizing and maintaining rangeland developments would be the same as under the *Proposed Action.*

Implementation

The *Seasonal Grazing* alternative would be implemented in the same manner as the *Proposed Action,* but no intensive grazing systems would be developed. BLM would continue to consult with ranchers and other interested parties throughout implementation of the rangeland program. Because several allotments in the EIS area are already running on a seasonal basis, some ranches would need little change. On those allotments, seasonal grazing management would be implemented as soon as the final grazing decisions are issued. Seasonal grazing on the rest of the allotments would be implemented within 5 years after grazing decisions have been issued and as funds are provided.

Ephemeral classifications under the ephemeral option would become effective 3 to 5 years after decisions are issued to give operators time to adjust their operations.

Burro capture plans would be prepared and implemented as under the *Proposed Action.*

Monitoring and Administration

BLM would monitor all allotments proposed for *Seasonal Grazing* (by such studies as actual use, utilization, and trend) to ensure that changes in rangeland condition and other factors are identified and quantified. BLM would also collect and analyze information on wildlife and other key

resources, especially riparian habitats. Where rangeland objectives are not being met, grazing practices would be changed as needed.

TABLE 2-10
SEASONAL GRAZING MANAGEMENT SUMMARY
(EPHEMERAL OPTION)

Seasonal Management--Perennial-Ephemeral	
(27 Allotments--864,000 Public Acres)	
Aguila	Los Caballeros
Babcock	Moralez
Cactus Garden	Narramore
Carco	Ohaco
Coughlin "A"	Orosco
Desert Hills "A"	Palmerita
Eagle Eye 6Y	Rees
Echeverria	Ridgeway Kong
Garcia	Salome Community
Hancock	Santa Maria
Harcuvar	Sky Arrow
Lamberson	Sprouse
Leidig	Wickenburg "A"
Loma Linda	

Intensive Management--All Perennial-Ephemeral
(1 Allotment--31,000 Public Acres)
Pipeline (Existing AMP)

Nonintensive Management	
(51 Allotments--498,000 Public Acres)	
Perennial-Ephemeral	
Auza	Hogue Produce
Bar D 4	James, H.
Bodfish	Jenner
Brown, Buck	KMJ
Cain	Medd
Carter	Park, H.
Central AZ	Park, R.
Coughlin "B"	Park, R. & E.
Cross Mountain	Peters
Date Creek	R. Santa Ynez
Desert Hills "B"	Satathite
Ekvall	Thompson
Foraker	Van Keuren
Globe	Vasilius
Gordon, R.	Wellik
Grantham	Whitehead
Hawkins	Wickenburg "B"
Heine	
Ephemeral	
Alamo	Hassayampa
Bialac	Jones
Calhoun	Primrose
Carter Herrera	Saddle Mountain
Douglas	Sitgreaves Red Hill
Eagle Eye	Turner
Effus	Wilson
Flat Iron	
Reserved For Wildlife	
White Tanks	

Livestock grazing would continue to be authorized through permits and leases. To change grazing use from that authorized by the permit, the operator would need BLM approval before making the change.

Unauthorized livestock use of public land would constitute trespass. Violators would be liable to the United States for the forage consumed by the livestock in trespass and for any expenses incurred if livestock need to be impounded during their removal.

Implementing *Seasonal Grazing* would require 40 workmonths per year beyond fiscal year 1982 funding. Administration and monitoring would require 20 additional workmonths per year after implementation.

Measures for Resource Protection and Enhancement

Measures identified for the *Proposed Action* would apply to the *Seasonal Grazing* alternative except those pertaining to intensive grazing systems. Where pastures do not exist to facilitate rest of riparian areas or crucial desert tortoise habitat, season of use on affected allotments would be changed to meet the needs of the critical resources.

ELIMINATION OF LIVESTOCK GRAZING (NO LIVESTOCK)

Overview

This alternative proposes to eliminate livestock grazing from public rangelands in the EIS area. It is addressed to show the impacts of removing livestock from the public lands, to provide BLM managers with a wider range of options under study, and to facilitate a meaningful comparison of alternatives.

The *No Livestock* alternative would cancel all grazing preferences on public lands. BLM would allocate forage and build and maintain rangeland developments for big game, wild burros, and other resources. To keep livestock off public lands, fences, cattleguards, and manual gates would have to be installed. Livestock grazing would be phased out over a 5-year period, but BLM would continue to monitor the rangeland for trespass and wildlife habitat conditions.

Eliminating livestock conflicts would allow more wild burros to be maintained than under the *Proposed Action*. Herd size would be kept at 1983 numbers (300) in the Alamo Herd Management Area, but populations in the Big Horn, Granite Wash, Harquahala, and Little Harquahala Mountains would be eliminated to resolve other resource conflicts. Big-game populations would be allowed to increase from present levels to optimum numbers in 20 years.

Forage Allocation

BLM would cancel all grazing preference on public lands and allocate no forage to livestock. At first BLM would allocate 9,574 AUMs for big game and 1,860 AUMs for wild burros. The remaining vegetation would serve other resource needs.

Twenty years after implementing the *No Livestock* alternative, increased forage would allow 6,400 more AUMs to be allocated to big game and wild burros. Allocations would reflect planning objectives and the needs of all resources. Table 2-3 shows initial and projected allocations for this alternative.

Rangeland Developments

BLM would build or maintain rangeland developments only to benefit wildlife, wild burros, watershed, and other resources. Livestock operators with investments in rangeland developments on public lands would be entitled to project salvage rights.

To prevent livestock from straying onto public lands, 1,750 miles of fence, 150 cattleguards, and 115 gates could be required. Initial construction costs would amount to $7,651,500, and annual maintenance costs would amount to $90,670. Developments needed to implement this alternative are listed in Table 2-6.

Implementation

Livestock grazing would be phased out over a 5-year period after grazing decisions have become final. Burro capture plans would be prepared and implemented as under the *Proposed Action* to remove wild burros from the Big Horn, Granite Wash, Harquahala, and Little Harquahala Mountains. The Alamo Herd Management Area Plan would be updated to reflect a base herd of 300 animals and plans prepared to remove excess burros every third year.

Monitoring and Administration

All livestock permits would be canceled. BLM would monitor wildlife and burro habitat conditions and periodically inspect public lands to detect possible livestock trespass. An average of 40 additional workmonths would be needed during each year of implementation. An average of 20 additional workmonths would be needed each year thereafter, primarily to monitor for trespass.

Measures for Resource Protection and Enhancement

With the exception of measures pertaining specifically to livestock grazing, all measures listed for the *Proposed Action* would also apply to the *No Livestock* alternative.

Alternative Eliminated From Study

During development of the land use plan and the scoping process, a *Wildlife Enhancement* alternative was considered for study. It was not included in the EIS, however, because it was determined that all significant wildlife and watershed recommendations in Step 1 of the MFP were carried through MFP Step 2. The *Proposed Action* thus incorporated all reasonable and significant measures that need to be taken to protect sensitive habitats or other resources in the EIS area.

Interrelationships

BLM's management of public lands in the EIS area is related to projects or management practices of other federal and state agencies and, to an extent, private enterprise.

Because BLM manages such a large percentage of the total land in the EIS area, its management practices strongly influence state and private lands interspersed with public lands. The various land managing agencies must closely coordinate to accomplish goals and avoid resource use conflicts.

FEDERAL PROGRAMS

U. S. Fish and Wildlife Service

BLM must consult with the Fish and Wildlife Service (FWS) when a BLM proposal may impact threatened or endangered plants or animals or their habitats. BLM has begun consultation for the Lower Gila North grazing management proposal in accordance with Section 7 of the Endangered Species Act (Appendix 17). FWS also has responsibility for animal damage control programs and has entered into a cooperative agreement (1976) with BLM and other agencies in Arizona to coordinate interagency involvement in such programs.

U. S. Army Corps of Engineers

The Corps of Engineers administers federal lands withdrawn for flood control surrounding Alamo Reservoir on the Bill Williams River. These lands form portions of two grazing allotments. BLM administers grazing on these lands, subject to the Corps' flood control management.

Soil Conservation Service

BLM must coordinate with the Soil Conservation Service (SCS) to meet numerous planning goals and resource man-

agement objectives. Details of this coordination are contained in "The Supplemental Agreement to the National Memorandum of Understanding Among Soil Conservation Service, Bureau of Land Management, U.S. Forest Service, State Land Department, and Natural Resource Conservation Districts." SCS also gives valuable assistance to BLM in completing rangeland inventories and coordinating with livestock operators.

STATE PROGRAMS

Arizona State Land Department

The Arizona State Land Department (SLD) administers 847,000 acres of state trust lands within the EIS area, leasing most for livestock grazing. BLM and SLD coordinate grazing administration on public and state trust lands interspersed within the same allotments. Cooperative agreements signed by both agencies in May and August 1979 require coordination of rangeland inventories and consultation during land use planning to achieve consistency between the two agencies. Further coordination with SLD is crucial before issuing decisions and developing AMPs.

Arizona Game and Fish Department

The Arizona Game and Fish Department (AG&FD) manages wildlife in Arizona. BLM manages wildlife habitat on public lands in the state and must coordinate its activities with AG&FD. Under cooperative agreement (1976) AG&FD assists BLM in planning rangeland developments and developing land use plans. BLM also cooperates with AG&FD in building wildlife facilities, preparing habitat management plans, completing wildlife surveys, and introducing game species to the public lands. AG&FD personnel greatly contributed to the development of big-game population estimates and wildlife recommendations in the Lower Gila North Land Use Plan.

Arizona State Historic Preservation Officer

BLM must coordinate with the Arizona State Historic Preservation Officer (SHPO) in meeting the requirements of Section 106 of the National Historic Preservation Act and 36 CFR 800. The Programmatic Memorandum of Agreement dated January 14, 1980 (Appendix 13) contains the details of this coordination. The agreement identifies actions BLM and SHPO will take to protect cultural and historical values from adverse impacts of the rangeland program.

Mormon Tea

Arizona State Clearinghouse

BLM is required by agreement and federal policy to notify the Arizona State Clearinghouse (within the Office of Economic Planning and Development) of major BLM programs, including land use plans and EISs. The clearinghouse then forwards the notification to interested or affected state agencies and political subdivisions, which in turn may respond to the proposal.

Arizona Range Research Task Force

BLM will consult with the Arizona Range Research Task Force during critical phases of its rangeland program.

Where appropriate, members of the task force will be involved in BLM plans for monitoring, grazing systems, innovative rangeland practices, and experimental programs.

Related Actions

BLM is required to consult with the District Engineer, Arizona Department of Transportation, when proposed rangeland developments would impact highway facilities or right-of-way fences. The District Engineer approves proposals on an individual project basis.

Where projects would impact county roads, approval must be obtained from the County Board of Supervisors.

Summary of Impacts

The analysis of the environmental consequences of the *Proposed Action* and alternatives reveals that none of the alternatives would measurably impact climate, topography, geology, minerals, air quality, urban land uses, social attitudes, or wilderness values. Significant impacts, beneficial and adverse, would occur to vegetation, wildlife, wildlife habitat, wild burros, livestock grazing operations, and ranch economics. Minor impacts would occur to recreation, visual resources, cultural resources, water quality, and soils.

Table S-1 summarizes significant, long-term impacts by alternative. Projected response of vegetation for each alternative is compared in Figure 2-1. For a more detailed analysis of impacts, see Chapter 4.

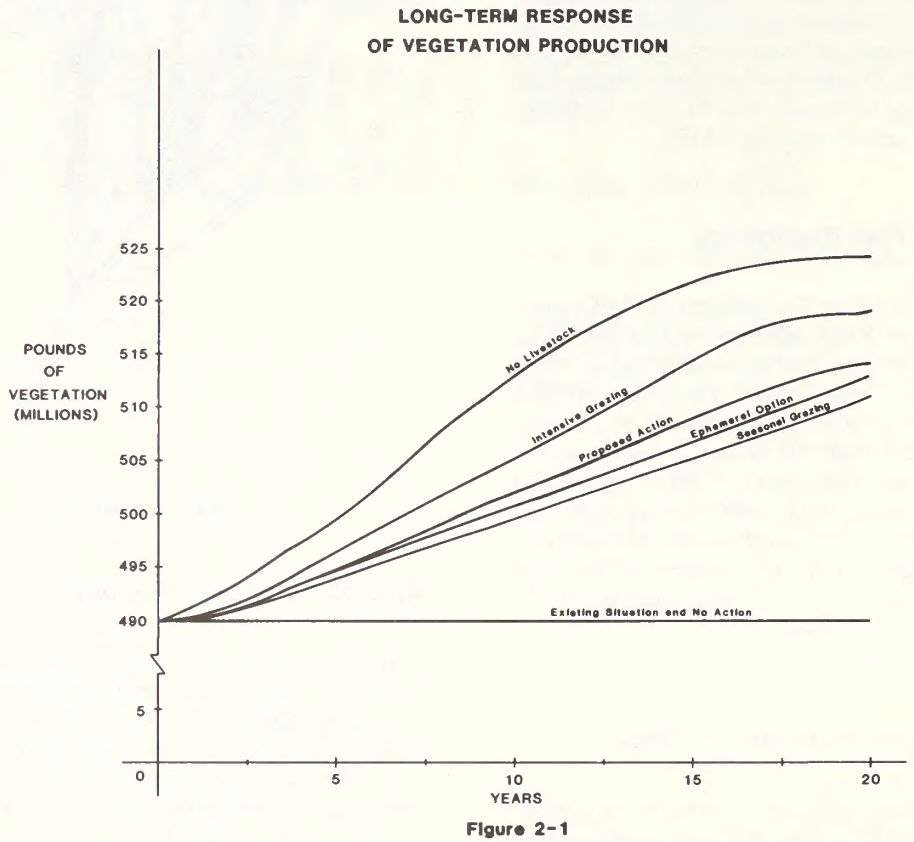


Figure 2-1

The curves represent estimated vegetation production in the EIS area over a 20-year period for each alternative. While general comparisons are made possible, actual vegetation production at any one time might vary from that shown in this figure.

Chapter 3

AFFECTED ENVIRONMENT

CHAPTER 3

AFFECTED ENVIRONMENT

Introduction

Chapter 3 briefly describes resources that might be impacted by the alternatives including the *Proposed Action*. Descriptions are only as detailed as needed for the reader to understand the effects of alternatives. Thus, where impacts to certain resources would be slight or nonexistent, descriptions are brief or are omitted.

More detailed descriptions of resources in the EIS area and regional socioeconomic conditions appear in the Lower Gila North Unit Resource Analysis (BLM, 1981a), the Lower Gila North Planning Area Analysis (BLM, 1981b), and the Lower Colorado Social-Economic Profile (BLM, 1979a). These documents may be reviewed in BLM's Lower Gila Resource Area and Phoenix District Offices.

Physical Setting

The EIS area is located in west-central Arizona and lies mostly within the Basin and Range physiographic province. Its landforms are typical of this province, consisting of broad desert basins bounded by relatively low mountain ranges. The Harquahala, Vulture, and Big Horn Mountains in the southern half of the EIS area and the Harcuvar, Weaver, and Buckskin Mountains in the northern half of the EIS area are the principal ranges. Granite mountains dominate the area, along with sedimentary rock outcrops in the western section and scattered basalt mesas. The area is drained by the Bill Williams River to the north and the Gila River to the south. Elevations range from 900 feet near Buckeye to 6,700 feet in the Weaver Mountains.

The EIS area's climate is influenced by tropical Atlantic and Pacific air masses during the warm months and by middle lattitude storms from the north Pacific during the cooler months. The average annual temperaure varies from 59°F at Hillside to more than 69°F near Tonopah. An extreme low of 3°F was recorded near Hillside, and an extreme high of 123°F near Tonopah. The frost-free growing season ranges from less than 180 days in the extreme northern part of the EIS area to over 260 days in the extreme southeastern section (BLM), 1981a).

Annual precipitation varies from 5 inches at Bouse to 17 inches at Tonto Springs Range Station 4W. Annual lows of 1.15 inches have been recorded near Tonopah, and annual highs of over 33 inches have been recorded at Walnut Grove. Forty percent of the annual precipitation occurs from December through March. Much of the remaining precipitation occurs during heavy thunderstorms from July through September (BLM, 1981a).

Vegetation

The EIS area is diverse in its topography, soil types, precipitation, and elevation. It has eight broad vegetation types based on dominant species aspects. Great variation exists within these types. Plant composition, vegetation density, production, and potential greatly differ, largely due to differences in climate and soils. Aspect, slope and elevation, however, also cause the vegetation to vary. The locations of vegetation types are shown on Map 3-1, and their characteristics are summarized in Table 3-1.

VEGETATION TYPES

Chaparral

Chaparral occupies 2 percent (21,500 acres) of the public lands in the EIS area. This type occurs between 4,000 and 7,000 feet in elevation, where annual precipitation averages from 12 to 16 inches. Chaparral provides significant forage and cover. Associated plants are mountain mahogany, shub live oak, desert ceanothus, cliffrose, manzanita, skunkbush, shrubby buckwheat, and desert needlegrass.

Creosotebush

The creosotebush type occupies 28 percent (393,700 acres) of the public lands in the EIS area and is the second most common vegetation type. It occurs from 500 to 2,500 feet in elevation, where annual precipitation averages from 4 to 10 inches. It produces little perennial forage but provides a large portion of the EIS area's ephemeral forage. Associated plants include white bursage, ironwood, ratany, and wolfberry.

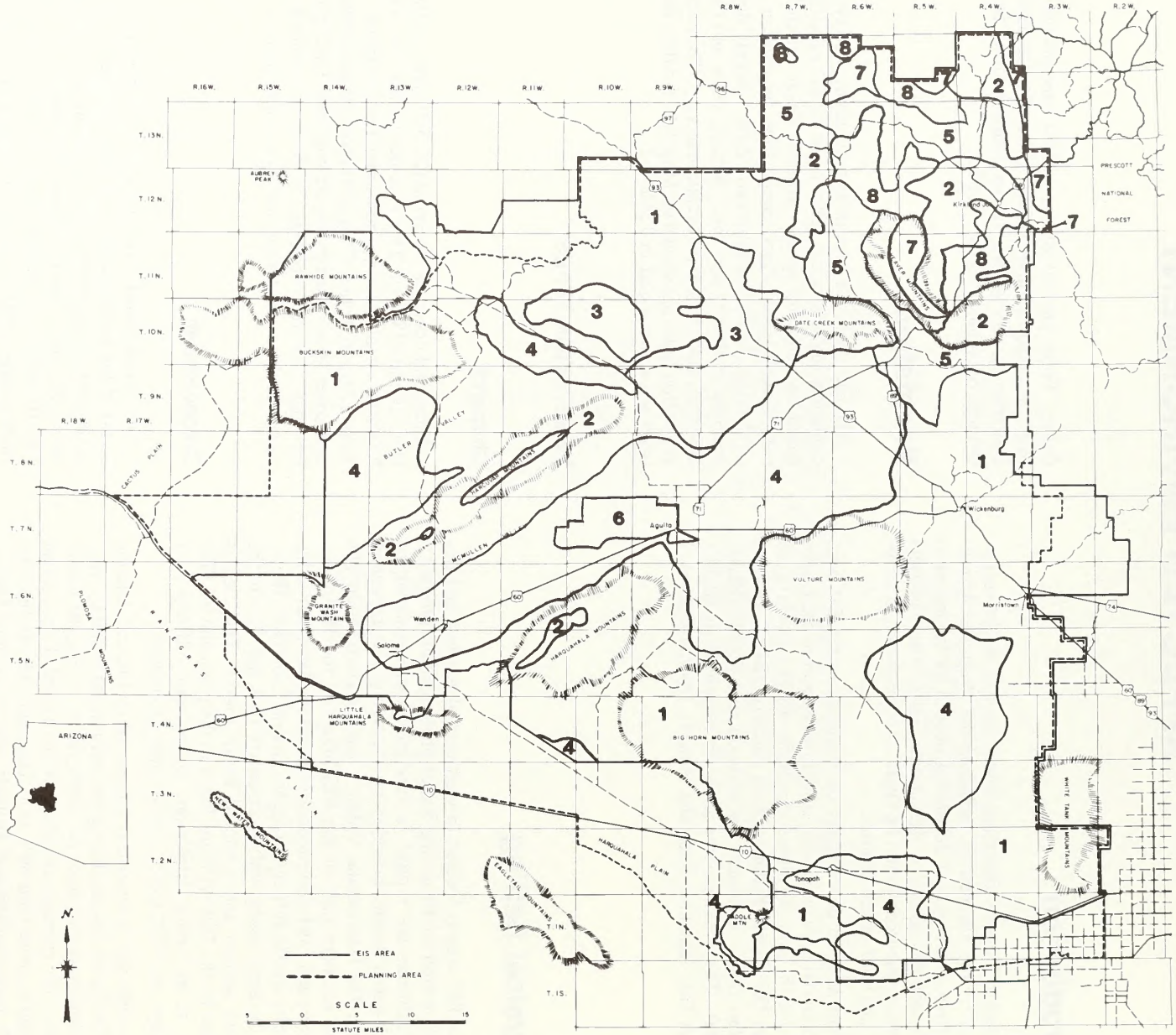
Desert Shrub

Desert shrub covers 3 percent (41,400 acres) of the public lands in the EIS area. It represents a unique type: a transi-

VEGETATION TYPES

LEGEND

1 PALOVERDE
2 CHAPARRAL
3 JOSHUA TREE
4 CREOSOTEBUSH
5 DESERT SHRUB
6 AGRICULTURAL
7 PINYON-JUNIPER
8 GRASS



MAP 3-1

VEGETATION

TABLE 3-1
CHARACTERISTICS OF VEGETATION TYPES*

	Vegetation Type								
	Chaparral	Creosotebush	Desert Shrub	Grassland	Joshua Tree	Paloverde	Pinyon-Juniper	Riparian	Total
Acres**	21,531	393,743	41,410	2,643	35,326	866,875	2,143	11,078	1,374,749
EIS Area (Percent)	2	28	3	< 1	3	62	< 1	1	—
Rangland Condition (Acres)									
Poor	4,112	108,213	611	82	1,068	106,963	0	1,234	222,283
Fair	442	181,994	30,699	1,023	16,072	479,424	0	3,939	713,593
Good	7,556	102,435	9,448	612	9,334	276,403	1,594	5,069	412,451
Excellent	9,421	1,101	652	926	8,852	4,085	549	836	26,422
Apparent Trend in Rangeland (Acres)									
Up	13,345	41,447	3,993	926	9,538	135,035	1,098	831	206,213
Static	5,667	310,875	29,901	1,635	24,375	704,722	844	8,032	1,086,051
Down	2,519	31,421	7,516	82	1,413	37,118	201	2,215	82,485
Cover (Percent)	52	15	29	31	27	26	45	57	—
Elevation (Feet)	4,000-6,000	1,000-3,000	3,000-5,000	4,000-6,000	2,000-3,000	1,000-3,000	4,000-6,000	Varies	—
Annual Precipitation (Inches)	12-16	4-10	8-14	10-16	8-10	4-12	10-16	Varies	—

* For public lands only.
** Does not include White Tanks allotment.

tion between the Mohave and Sonoran Deserts. It occurs between 2,000 and 4,000 feet in elevation in the 8 to 14 inch precipitation zone, generally between the chaparral type above and the crosotebush and paloverde types below. Associated plants include flattop buckwheat, Mohave thorn, prickly pear, snakeweed, brittlebush, twinberry, ratany, globemallow, triangle bursage, and jojoba.

Grassland

The grassland type covers less than 1 percent (2,600 acres) of the public lands in the EIS area but is one of the most important types for forage production. It occurs primarily in valleys and on mesa tops between 4,000 and 6,000 feet in elevation, where annual precipitation averages 10 to 16 inches. Associated plants include big galleta, tobosa, black grama, squirreltail, blue grama, hairy grama, snakeweed, and catclaw.

Joshua Tree

The Joshua tree type covers 3 percent (35,300 acres) of the public lands in the EIS area. It occurs between 2,000 and 3,000 feet in elevation, where annual precipitation averages from 8 to 10 inches. Associated plants include creosotebush, white bursage, buckhorn cholla, big galleta, and bush muhly.

Paloverde

Paloverde is the EIS area's most common vegetation type, occupying 62 percent (866,900 acres) of the area's public lands. It occurs largely in the central and southern portions, between 1,000 and 3,000 feet in elevation, where annual precipitation averages 4 to 12 inches. This type generally has the greatest vegetation density on bajadas and in desert washes. It produces little perennial forage but abundant ephemeral forage under favorable climatic conditions. Associated plants include saguaro, creosotebush, ocotillo, wolfberry, big galleta, and bush muhly.

Pinyon-Juniper

The pinyon-juniper type is found on less than 1 percent (2,100 acres) of the public lands in the EIS area. It occurs on slopes between 4,000 and 6,000 feet, where annual precipitation averages from 10 to 16 inches. This type is associated with desert ceanothus, shrub live oak, squirreltail, and black grama.

Riparian Vegetation

Riparian vegetation covers 1 percent (11,100 acres) of the public lands in the EIS area. It grows along streambanks

and water bodies and around springs and seeps (Map 3-3). Associated plants include cottonwood, willow, ash, desert willow, mesquite, and saltcedar. Riparian areas include 2,100 acres of broadleaf riparian and 9,000 acres of mesquite riparian. For vegetation analysis, both broadleaf and mesquite types are grouped under the general heading of riparian.

Riparian communities in good condition have an abundant and diverse assortment of plants. In healthy communities age distribution of trees is good, the soil is mostly covered with vegetation, and little bank erosion occurs.

Riparian areas are valuable to wildlife, burros, and livestock, supplying shade, water, cover, and forage. As a result, riparian areas are usually grazed more heavily than are upland zones (Platts, 1979).

EPHEMERAL VEGETATION

Ephemeral (annual) vegetation occurs throughout most of the EIS area below 4,000 feet. Desert ephemerals geminate rapidly and mature early under the proper combination of favorable temperature and adequate moisture. The life cycle of many species lasts only from 5 to 6 weeks (Shreve, 1942). Annuals such as filaree, Indian wheat, Mediterranean grass, red brome, and fiddleneck provide most of the EIS areea's ephemeral forage (BLM, 1981a). During years with above-average rainfall, production of ephemeral vegetation can be many times the yearly perennial production. These ephemerals provide almost all the forage on ephemeral allotments and are also important forage producers on perennial-ephemeral allotments during years of above-average rainfall.

PHENOLOGY

Knowledge of the phenological stages of key forage plants is needed for developing grazing systems that provide for the physiological needs of those plants. Table 3-2 shows the phenological developmental stages for selected key species in the EIS area. The dates, however, represent an average, since many southwest desert plants are opportunistic, growing and reproducing at any time of the year under suitable temperature and moisture conditions (BLM, 1981a). Climatic variations in the southwest desert require management systems that can adjust to variations in phenology of desirable forage plants. In addition to key species listed in Table 2-2, other key species that may be monitored for phenology include slender janusia, lanceleaf ditaxis, wire lettuce, shortleaf baccharis, and desert ceanothus.

RANGELAND CONDITION

Rangeland condition estimates were based on comparing existing plant species composition on range sites with presumed climax plant composition as described in range site guides developed jointly by BLM and the Soil Conservation Service. The closer a range site is to its climax stage, the higher is its condition rating. Management plans are gener-

TABLE 3-2
PHENOLOGY OF SELECTED KEY SPECIES

Plant	Developmental Stages (Average Dates)			
	Start Growth	Flower	Seed Ripe	Dormancy
Big Galleta	July	August	August	November
Black Grama	May	July	August	October
Bush Muhly	July	August	August	October
Desert Globemallow	July	March	April	December
Desert Needlegrass	April	May	June	November
False Mesquite	March	April	May	November
Flattop Wild Buckwheat	April	May	June	November
Fourwing Saltbush	March	August	September	October
Mexican Bladdersage	July	April	April	May
Mormon Tea	April	April	May	November
Range Ratany	March	May	June	October
Short-leaf Baccharis	April	August	September	October
Tobosa	April	July	August	October
Twinberry	April	May	June	November
White Ratany	February	April	May	December

ally designed to improve the condition of the rangeland towards climax, but a climax state is not always desirable. Range specialists must determine whether the climax plant community is the most productive or the most desirable condition to be achieved. Management plans may then be designed to produce the desired condition. The methodolgy for determining rangeland condition is described in Appendix 2. Rangeland condition by vegetation type as determined by the rangeland inventory is shown in Table 3-1.

In the EIS area, 2 percent of the public rangelands is in excellent condition, 30 percent is in good condition, 52 percent is in fair condition, and 16 percent is in poor condition.

The range site system used on ecological approach to evaluate a specific site. For example, a low producing site within the creosotebush type, rated in good to excellent ecological condition by the range site guides, may have little useable forage for livestock and certain wildlife species. The site would thus be considered in poor condition for livestock and wildlife forage production.

APPARENT TREND

Rangeland trend is the direction of change in rangeland condition. The present ecological rangeland condition rating alone does not show whether the plant community is improving or deteriorating in relation to its potential. Trend is a separate determination needed to assess what is happening to the plant community. The present rangeland condition is a result of a sustained trend over time. Trend is a much more sensitive indicator of change than condition.

Rangeland trend is developed from data collected over a period of time. Since trend studies have not been established within the EIS area, apparent rangeland trend was determined during the rangeland inventory during 1979 and 1980. Methodology for determining apparent trend is found in Appendix 2.

The apparent rangeland trend information represents only a single year's observations and thus may not reflect the actual long-term trend of an area. BLM determined apparent trend to facilitate analysis and to identify allotments needing special attention during development of management or monitoring plans. The rangeland inventory showed that apparent trend in condition of public lands within the EIS area is 80 percent static, 15 percent up, and 5 percent down. Table 3-1 shows the apparent trend by vegetation type, and Appendix 3 shows apparent trend by allotment.

PROTECTED PLANTS

No officially documented federally listed threatened or endangered plant species inhabit the EIS area. The Fish and Wildlife Service (FWS), however, has recently published a list of plants under review for listing as threatened or endangered (Table 3-3). The EIS area has four species on this list. In addition, BLM has determined that the EIS area has five species considered to be sensitive (Table 3-3). These species also appear on the Arizona Natural Heritage Program's list of special plants and are listed by the Arizona Commission of Agriculture and Horticulture. Four of the species are affected by grazing and trampling by livestock, wild burros, and wildlife.

TABLE 3-3
PROTECTED PLANTS

Scientific Name	FWS Candidate Species	Listed by BLM	Listed by Arizona Natural Heritage Program	Listed by Arizona Commission of Agric. & Hort.	Affected by Grazing
Allium bigelovii		X	X	X	
Juncus articulatus		X	X		X
Mammillaria viridiflora	X	X	X	X	X
Opuntia phaeacantha var. flavispina	X	X		X	
Opuntia wigginsii	X	X	X	X	
Peniocereus greggii	X	X		X	
Stillingia linearifolia		X	X		
Thelypteris puberula var. sonorensis		X	X		X

Additional information on these species is included in the Lower Gila North Unit Resource Analysis (BLM, 1981a) and the Lower Gila North Management Framework Plant (BLM, 1981c).

Soils

The EIS area covers parts of four counties, where soils greatly vary in chemical and physical characteristics and occur in complex patterns. The Soil Conservation Service has compiled detailed soils information for Maricopa and Yavapai Counties and general soils maps for Mohave and Yuma Counties.

The EIS area contains three classes of soil temperature regimes: Hyperthemic (72°f or higher), Thermic (59-72°F), and Mesic (47-59°F). The temperature of the soil and its effect on soil moisture is one of the most important properties controlling plant growth and soil formation. These combined properties help determine what rangeland sites occur on a specific soil. Mesic (cool) soils occur in the northeast corner of the EIS area at elevations above 4,800 feet (soil associations 4, 24, 25, 26, 27, and 28) where annual precipitation ranges from 12 to 16 inches. Thermic (warm) soils occur in the central EIS area at elevations from 2,200 to 4,800 feet (soil associations 1, 2, 4, 6, 8, 12, 13, 14, 23, 29, and 30), where annual precipitation ranges from 8 to 12 inches. Hyperthermic (hot dry) soils occur in the south and southwest EIS area, generally at elevations below 2,200 feet (soil associations 3, 5, 7, 9, 10, 15, 16, 17, 18, 19, 20, 21, and 22), where annual precipitation ranges from 2 to 7 inches.

SOIL ASSOCIATIONS

Thirty soil associations occur in the EIS area. Appendix 10 lists the percent of each major soil within each association, major limiting factors of each association, and the dominant physical properties of each soil.

The General Soil Map of the EIS area (Map 3-2) does not show the exact soil at any particular place but rather the pattern of occurrence on the landscape. The information is useful for general planning, but these data should be applied with care for site-specific interpretations.

SOIL EROSION AND PRODUCTIVITY

Soil erosion in the EIS area is generally low due to the gravelly or cobbly surface layer that protects the soil from the impact of raindrop splash and channel runoff. The amount and intensity of rainfall greatly vary, making soil erosion and sedimentation levels hard to calculate or predict. Sheet and streambank erosion cause most soil movement during high-intensity rainstorms.

Soil Surface Factor (SSF) was used to determine the present erosion condition for the EIS area. (See Glossary for definitions of SSF and erosion condition classes.) The rangeland inventory found a few areas in a severe erosion class, totaling about 1 percent of the EIS area. Most severe erosion occurs along Date Creek and at the Anderson Mine on the Santa Maria River and results from high geologic erosion and accelerated erosion from mining. Moderate erosion occurs on 10 percent of the EIS area, much of which is in a poor rangeland condition.

Low plant vigor, poor species composition, and insufficient effective ground cover have contributed to a general decline in watershed stability on areas in poor and fair rangeland condition. Though these factors leave portions of the rangeland more susceptible to impact from extreme climatic elements, the current annual soil loss in the EIS area is not a significant problem. BLM studies using the Universal Soil Loss Equation on six EIS area range sites in various condition classes found soil loss to average less than 0.2 tons/acre/year.

Riparian areas along the Bill Williams and Santa Maria Rivers and major washes in the EIS area have isolated severe erosion conditions along streambanks and floodplains, which are aggravated by heavy grazing pressure from livestock, burros, and wildlife. Table 3-4 shows erosion condition classes by acreage on public land. Erosion hazard for each soil is shown in Appendix 10.

TABLE 3-4
SOIL EROSION CLASSES

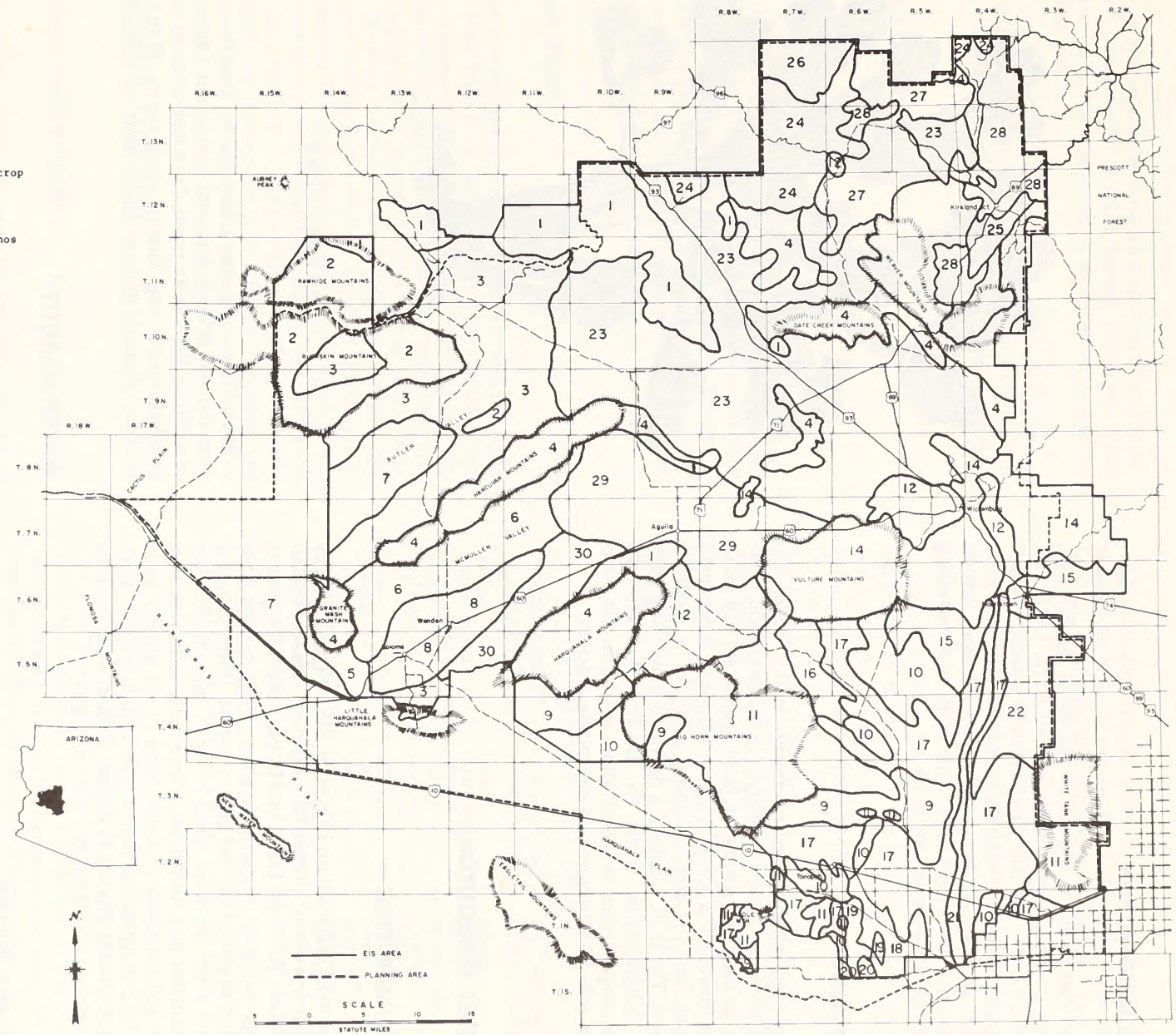
Erosion Condition	Public Land (Acres)
Stable	382,200
Slight	866,400
Moderate	142,900
Severe*	1,500
Total	1,393,000

* Critical erosion classes were combined with severe classes because of small acreage involved.

SOIL ASSOCIATIONS

LEGEND

1. House Mountain-Lehmans-Rock-Outcrop
2. Lomitas-Rock-Outcrop
3. Gunsight-Rillito-Cavelt
4. Cellar-Rock-Outcrop
5. Quilitosa-Rock-Outcrop
6. Whitlock-Continental-Tres Hermanos
7. Aco-Gunsight-Rillito
8. Cherum-Hayhook-Glendale
9. Chuckawalla-Gunsight
10. Aco-Momoli-Poquette
11. Quilitosa-Cherioni-Gachado
12. Greyeagle-Continental-Cave
13. Eba-Pinaleno-Tres Hermanos
14. Lehmans-Dixaleta-Gran
15. Ebon-Pinamt-Tremant
16. Carefree-Suncity-Cipriano
17. Gunsight-Rillito-Tremant
18. Casa Grande-Harqua
19. Gilman-Estrella-Avondale
20. Laveen-Coolidge
21. Brios-Carrizo
22. Contine-Mohall
23. Continental-Whitlock-Cave
24. Barkerville-Moano-Rock-Outcrop
25. Luzena-Faraway-Rock-Outcrop
26. Cabezon-Thunderbird-Venezia
27. Springerville-Cabezon
28. Lonti-Balon-Lynx
29. Continental-Mohave-Guest
30. Hayhook-Eba-Pinaleno



MAP 3-2

SOIL COMPACTION

Soil compaction occurs on 10 percent of the EIS area, where soils are clayey (soil associations 6, 12, 13, 15, 16, 23, 26, 27, 29, and 30). Compaction is a problem where livestock, burros, and wildlife concentrate, such as at water troughs and corrals, in riparian areas, and along fences. Compaction decreases water infiltration, thus increasing runoff and the potential for soil loss.

SEDIMENT YIELD

Sediment yield for the allotments in the EIS area is unquantified. A qualitative analysis of sediment yield, however, for each soil association in the area shows that yields range between 0.2 acre-feet/square mile/year, a negligible amount, and 1.0 acre-feet/square mile/year, a moderate amount. The U. S. Geological Survey is monitoring water and sedimentation levels on the Bill Williams and Hassayampa Rivers, results of which will be used in correlation with BLM's rangeland monitoring program.

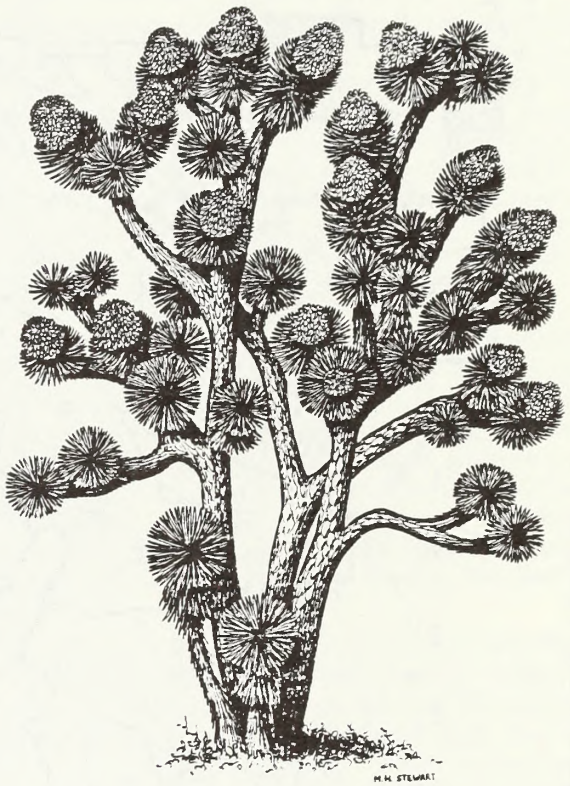
Water Resources

GROUND WATER

The most important aquifers in the EIS area are the valley and fan deposits of alluvial fill. Major aquifers are the Butler Valley, Ranegras Plain, McMullen Valley, Harquahala Plains, and lower Hassayampa areas. Wells in these areas yield up to several hundred gallons/minute. Other sources of ground water are wells along fractures in crystalline and metamorphic rock formations. These wells yield an average of 10 gallons/minute or more. Most of the ground water used by grazing animals comes from wells tapping fractures or small alluvial deposits in washes. Ground water has been developed on 23 allotments in the EIS area.

SURFACE WATER

Five watersheds, all in the lower Colorado River Basin, drain the EIS area: Bouse and Centennial Washes, and the Bill Williams (including Alamo Lake), Hassayampa, and Santa Maria Rivers. Perrennial streams in the Hassayampa and Santa Maria watersheds provide instream water for grazing animals as well as for aquatic and riparian habitats. These waters are supplemented by many stockponds and springs.



Joshua Tree

Streamflow in the area greatly varies. Peak flows occur from October through April and in July and August. Most runoff from BLM lands results from high-intensity summer thunderstorms or long-duration winter storms. With few exceptions, channels draining public lands are normally dry.

WATER QUANTITY

Grazing animals consume relatively small amounts of water, and water supply problems in grazing management are related more to distribution than to adequacy. Livestock, big game, and wild burros in the EIS area are estimated to need 63 acre-feet/year of water. Watering facilities on public land have the potential to supply 130 acre-feet/year.

Important nonconsumptive water uses are aquatic and riparian habitats along Kirkland Creek, Centennial Wash, and the Santa Maria, Hassayampa, and Bill Williams

Rivers, as well as several livestock reservoirs where the impounded area provides wildlife habitat. Generally, water maintains game populations along all the streams, washes, and some reservoirs.

Surface water yields for the watersheds average more than 170,000 acre-feet/year, and the EIS area has an estimated 40-50 million acre-feet of ground water in storage.

WATER QUALITY

Ground Water

Total dissolved solids (TDS) for the area's ground water range from 200 to over 1,100 milligrams/liter. Average TDS is 564 milligrams/liter. Ground water in the area is suitable for irrigation and livestock consumption, but its fluoride content generally exceeds maximum allowable concentrations for public water supplies.

Surface Water

Water quality data for streams in the EIS area are inadequate. Data from U. S. Geological Survey (USGS) water quality stations on the Bill Williams and Gila Rivers indicate that water is not suitable for domestic use. Under Arizona Department of Health Services' water quality standards, the fecal coliform count in both these rivers is too high, even for livestock watering. Although USGS stations lie outside the EIS area and may not be representative of it, both rivers receive some water from the EIS area, and pollution could come from sources within it. Contaminants most associated with grazing are fecal coliform, sediment, and nutrients. These pollutants result from animal contact or are introduced to streams as sediment.

Livestock Grazing

EXISTING OPERATIONS

Sixty-eight permittees operate 78 grazing allotments in the EIS area, involving 1,375,000 acres of public land within Yuma, Mohave, Yavapai, and Maricopa Counties (see Plate 1).

These livestock operations vary greatly and may involve complex ownership relationships. Eight operations include more than one allotment. Some operations are run by individuals, whereas others are run by families, corporations, or a combination of all three. Individual livestock operations use from 150 to 224,000 acres of public land.

Many of the livestock operators using public lands supplement their ranch income from such sources as farms, feedlots, and ranches outside the EIS area and jobs unrelated to agriculture.

From 5-year average licensed use records, EIS area ranches have been divided into three size categories: small ranches — 0-99 head, medium-sized ranches — 100-199 head, and large ranches — over 200 head.[1]

The 14 small ranches have a combined authorized grazing preference of 708 head, but their licensed use over the past 5 years has averaged 591 head or 83 percent of preference. The 10 medium-sized ranches have a combined authorized grazing preference of 1,124 head but a 5-year average licensed use of 824 head or 73 percent of preference. The nine large ranches have a combined authorized grazing preference of 2,317 head and a 5-year average licensed use of 1,724 or 75 percent. Combined authorized grazing preference for all allotments in the EIS area is 58,155 AUMs, and average licensed use is 46,033 AUMs or 79 percent of preference. Table 3-5 groups allotments by size class.

TABLE 3-5
RANCH OPERATIONS BY SIZE CLASS

Small Ranches (0-99 Head)	Medium Ranches (100-199 Head)	Large Ranches (200 Head and Over)
Babcock	Effus	Aguila
Cactus Garden	Flat Iron	Calhoun
Carter Herrera	Hancock	Carco[2]
Desert Hills A & B	Leidig	Central AZ[2]
Eagle Eye 6Y	Loma Linda	Coughlin A & B
Garcia	Los Caballeros	Douglas
Jones	Pipeline	Echeverria[3]
Moralez	Rees	Ohaco[3]
Orosco	Santa Maria	Harcuvar[4]
Palmerita	Sky Arrow[1]	Lamberson[4]
Saddle Mountain	R. Park[1]	Narramore[5]
Salome Community	R. & E. Park[1]	Ridgeway Kong[5]
Sitgreaves Red Hill		Wickenburg A & B
Sprouse		

1,2,3,4,5 These combinations of allotments represent ranch units.

Thirty-six allotments are designated as perennial-ephemeral, and these generally involve cow-calf operations. On perennial-ephemeral rangeland, enough perennial forage is produced to carry a base herd each year. When a combination of favorable temperature and adequate moisture also produces an ephemeral forage crop, the allottee may apply to use the ephemeral forage. BLM, however, may issue a license only after ephemeral forage is assured on perennial-ephemeral ranges.

[1] In describing and analyzing ranch operations, this section of the EIS uses livestock numbers for federal, state, and private land to present a complete overview of how BLM proposals would affect ranching. To be consistent with the remainder of the allocation process, data used elsewhere in the EIS to describe livestock numbers are for public lands only. Allotments now designated custodial are not included in ranch size categories because sufficient data do not exist.

Seven allotments in the EIS area lack enough perennial forage to support a large enough base herd to justify an allottee's supervision, maintenance, and handling costs. Such allotments are designated ephemeral. Under the special ephemeral rule published in the *Federal Register* on December 7, 1968, BLM may issue a license for ephemeral allotments only when precipitation and temperature show the probability of an ephemeral crop.

The EIS area contains 35 allotments designated as custodial. These allotments have relatively small amounts of public land. They are licensed for the capacity of the public land, but overall numbers are not controlled since none of the public land is fenced from state or private land.

One grazing allotment (Pipeline) in the EIS area is now managed under an allotment management plan.

All allotments have rangeland developments built to manage livestock distribution (water developments, fences, and cattleguards) or to help in livestock management (corrals). Developments for controlling livestock distribution have been built by BLM, by operators, or by both through cooperative agreements. These developments include 245 reservoirs, 25 improved springs, 159 wells, 81 miles of pipeline, 8 cattleguards, and 709 miles of fence.[2] Existing rangeland developments by allotment are shown in Appendix 12.

LIVESTOCK PERFORMANCE

Many ranches in the EIS area are cow-calf operations under yearlong grazing and derive most income from the sale of calves, yearlings, and cull cows. Calf crops range from 70 to 79 percent, depending on ranch size. An average of from 15 to 17 percent of cows are culled from herds each year. Sheep are run yearly on the Eagle Eye allotment. During good ephemeral years, supplemental licenses are usually issued for sheep on three other allotments: Ohaco, Sitgreaves Red Hill, and Echeverria. Stocking rates greatly vary year to year. Table 3-6 shows herd characteristics for each ranch size.

TABLE 3-6
HERD CHARACTERISTICS BY RANCH SIZE

	Ranch Size		
Herd Characteristics	Small Ranch 0-99 Head	Medium Ranch 100-199 Head	Large Ranch > 200 Head
Brood Cows (Number)	48	129	460
Bulls (Number)	3	9	33
Herd Size (Number)	51	138	493
Cull Cows (Percent)	17	16	15
Cow Death Loss (Percent)	5	5	4
Calf Death Loss (Percent)	5	5	6
Calf Crop (Percent)	79	76	70

Source: BLM Ranch Budget Meetings, Wickenburg, Arizona, July, 1981.

[2] Some of these reservoirs may not contain water yearlong, especially in years of low rainfall.

Wildlife

The Lower Gila North Planning Area is one of the more diverse biotic areas in Arizona. Wildlife habitat inventories identified 16 kinds of terrestrial and aquatic habitats, ranging from the pinyon-juniper woodlands of the Weaver Mountains to the creosotebush flats of Butler Valley and the lush broadleaf riparian habitat of the upper Hassayampa River.

Such a variety of habitats has resulted in a wealth of wildlife inhabitants — over 360 species in the area. This wealth, however, is spread thinly over the public lands in the planning area, since the habitat-rich northestern third consists mostly of state and private lands.

This section individually discusses key wildlife species, federally listed, state protected, unique, or of high economic value, if they are expected to be significantly impacted by the *Proposed Action* or alternatives. The focus will be on habitat factors that support wildlife — food, cover, water, and space.

Little population status and trend data exist for planning area wildlife other than big game, but habitat condition is fairly well known (Jones and Porzer, in preparation; Millsap, 1981; Ough and Miller, 1980). Table 3-7 summarizes wildlife habitat trends and impacts resulting from grazing operations.

The following discussion will apply only to public lands,

BIG GAME

Mule Deer

An estimated 2,800 mule deer occupy yearlong all 1,393,000 acres in the EIS area (BLM, 1981a). Highest densities occur in the Harquahala, Harcuvar, and Weaver Mountains. Preferred habitat is in the chaparral, pinyon-juniper, and desert shrub vegetation types. Populations are slightly declining (Ough and Miller, 1980), although hunter demand is increasing.

Habitat conditions for deer vary throughout the planning area. Cover is adequate throughout, but food, water, and space are limiting factors in different allotments.

Deer compete closely for forage with cattle and burros. The greatest competition occurs between deer and cattle on allotments depleted of grass, where cattle have turned to browse as a major part of their diet. This condition is evident in preferred deer habitat in the foothills and notably in the Weaver Mountains (Hawkes, 1978). Deer and cattle compete heavily throughout deer habitat under 3,000 feet in elevation. Important species for deer in these competitive areas (globemallow, Mormon tea, slender janusia, range

TABLE 3-7
EXISTING WILDLIFE AND HABITAT IMPACT TREND RATINGS*

Alternative's Features	Big Game				Special Status Species				
	Mule Deer	Bighorn Sheep	Pronghorn Antelope	Javelina	Federal-Listed Threatened/ Endangered Species	Other Protected Species**	Upland and Small Game	Nongame Wildlife	Riparian Habitats
Grazing Use									
Vegetation Production Available	2	4	2	4	2	2	3	2	1
Levels of Grazing Management									
Intensive	4	NA	NA	4	3	2	4	3	NA
Nonintensive	2	2	2	3	3	2	3	3	1
Ephemeral	3	3	NA	4	3	3	3	3	2
Management Facilities									
Water Developments	3	2	3	3	NA	2	2	2	1
Fencing	2	2	2	3	NA	NA	NA	NA	NA
Average	2.7	2.6	2.3	3.3	2.8	2.2	3.0	2.6	1.6
						Average Rating for Existing Situation			2.5

* Rating System: 1 = most significant downward trend; 2 = downward trend; 3 = relatively static; 4 = upward trend; 5 = most significant upward trend; NA = not applicable.
** Proposed threatened or endangered species, state-listed species, BLM sensitive species.

ratany, and shrubby buckwheat) are often grazed beyond proper use.

Burros compete with deer in the paloverde habitat of four allotments next to Alamo Lake and the Bill Williams and Santa Maria Rivers, using much the same forage as deer (BLM, 1981a). Fire in the chaparral vegetation type often results in better short-term browse production for deer.

The lack of water influences the distribution and population growth of mule deer. For this reason, deer use is limited mainly to the south half and the west third of the planning area.

Livestock waters may benefit deer, but fences or corrals may restrict free access to water. Fencing can restrict free movement of deer, and unmaintained fences can cause entanglement in downed or loose wire.

Burros compete with deer for space in the northwest part of the planning area, displacing deer around waters and upsetting deer use patterns (Farrell, 1973), especially in the Rawhide Mountains.

Pronghorn Antelope

No pronghorn reside on public lsands in the planning area, though they range on nearby state and private grassland in Peeples Valley (Map 3-1), where their populations are declining. Pronghorn habitat will be discussed because some alternatives would improve their habitat on public lands.

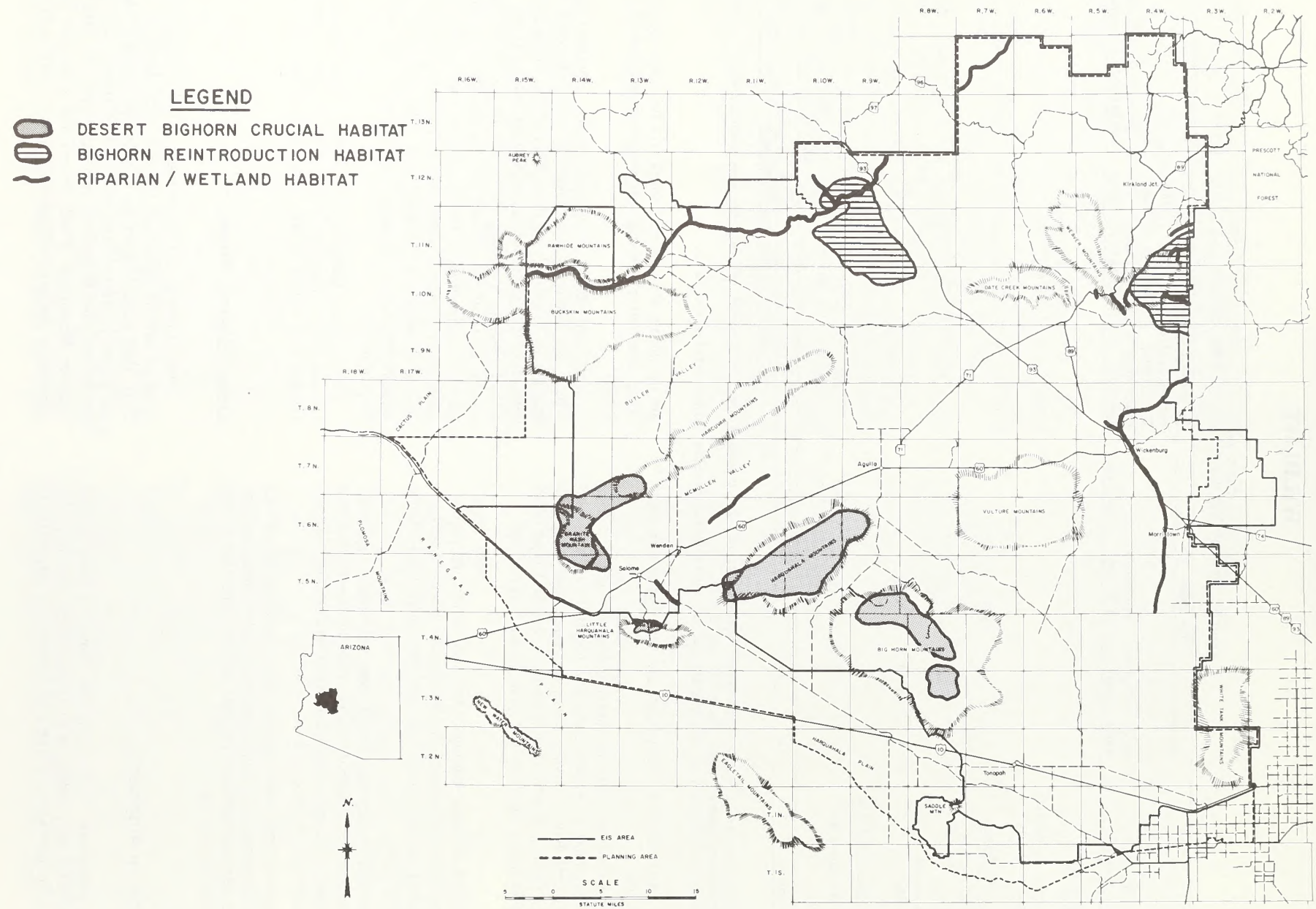
Pronghorn forage is limited in the grassland habitat, which has relatively few palatable perennial forbs — the major part of pronghorn diets. Cover also limits pronhorn numbers. Pronghorn prefer vegetation whose height averages 15 inches (Yoakum, 1975). By the end of the growing season most of the grasses are grazed down to about 2 inches. Large disturbed areas around stock tanks on the mesas may extend a fourth of a mile from a water and be devoid of escape or hiding cover. The lack of cover increases stress on antelope and makes them more vulnerable to predators.

Fences block pronghorn movement, often causing death (Rouse, 1954; Yoakum, 1978). Most fences in pronghorn habitat do not meet BLM's specifications for pronghorn.

Desert Bighorn Sheep

Approximately 100 desert bighorn sheep occupy 64,400 acres of crucial habitat in the EIS area (Map 3-3, Table 3-8). They range through the Eagle Eye, Salome Community, Carter Herrerra, Orosco, Ohaco, Calhoun, and Aguila allotments and historically extended into the Black and Weaver Mountains. Food, water, and space are limiting factors to the area's bighorn. Cover is not a problem.

DESERT BIGHORN AND RIPARIAN HABITAT



MAP 3-3

TABLE 3-8
CRUCIAL WILDLIFE HABITAT BY ALLOTMENT*

Allotment	Habitat Type
Aguila	Desert Tortoise-13,400 acres; Desert Bighorn-41,700 acres
Alamo	Desert Tortoise-1,600 acres; Riparian-800 acres**
Babcock	Riparian-800 acres
Brown, Buck	Riparian-100 acres
Cactus Garden	Desert Tortoise-1,600 acres; Riparian-30 acres
Calhoun	Desert Tortoise-6,400 acres; Bighorn-9,000 acres
Carco	Desert Tortoise-2,600 acres
Coughlin "A"	Riparian-100 acres
Desert Hills "A"	Desert Tortoise-2,700 acres
Echeverria	Desert Tortoise-2,300 acres
Effus	Desert Tortoise-1,000 acres
Globe	Riparian-150 acres
Hancock	Desert Tortoise-1,900 acres; Bighorn-8,100 acres
Hogue Produce	Desert Tortoise-1,200 acres
Jones	Riparian-80 acres
Lamberson	Riparian-200 acres
Leidig	Desert Tortoise-1,900 acres; Bighorn-3,200 acres
Loma Linda	Desert Tortoise-4,500 acres
Los Caballeros	Desert Tortoise-5,100 acres
Medd	Riparian-70 acres
Moralez	Riparian-50 acres
Ohaco	Desert Tortoise-3,200 acres; Bighorn-2,400 acres
Palmerita	Desert Tortoise-3,200 acres; Riparian-700 acres
Park, R.	Desert Tortoise-4,500 acres; Riparian-50 acres
Pipeline	Desert Tortoise-2,500 acres
Primrose	Desert Tortoise-19,000 acres; Riparian-600 acres
Ridgeway Kong	Desert Tortoise-5,000 acres; Riparian-100 acres
Santa Maria	Desert Tortoise-11,500 acres; Riparian-1,000 acres
Sky Arrow	Desert Tortoise-5,800 acres; Riparian 200 acres
Van Keuren	Riparian-50 acres
Whitehead	Riparian-400 acres
White Tanks	Desert Tortoise-4,100 acres
Wickenburg "A" Wickenburg "B"	Desert Tortoise-4,800 acres

* Acre estimates for public land only.
** Riparian acre values include about half mixed broadleaf riparian and half mesquite riparian. The remaining mesquite riparian is widely scattered through the EIS area.

Bighorn sheep mainly compete for forage with wild burros to the north and slightly with cattle to the south in the foothills with slopes less than 25 percent. Burros probably compete with bighorn more effectively for forage than do cattle, since burros are opportunistic and destructive feeders. Recently wild burro numbers were reduced in the north EIS area, possibly allowing a slow recovery of habitat.

Lack of water is the single most limiting factor for bighorns (Blaisdell and others, 1980). Good permanent water sources are lacking in bighorn habitat. Several waters are known in the area, but stock tanks and wells developed for livestock are most common.

Bighorn sheep must be able to move freely and are typically intolerant of human disturbance and developments. Fences create hazards for bighorn. Unless properly constructed, fences block movement and become death-traps, especially for rams (Russo, 1956; Kelly, 1960; and Helvie, 1971). Most fences in the EIS area do not meet BLM bighorn safety specifications.

Bighorn are also intolerant of livestock and wild burros. Cattle and wild burros compete with bighorn for space (Trefethen, 1975; McKnight, 1958), and an aversion to cattle keeps bighorn from preferred waters and foraging habitat. Gallizioli (1977) attributes the major past bighorn declines in the EIS area to livestock overgrazing. In addition, livestock have brought diseases harmful to bighorn into sheep habitat (Bunch, Paul, and McCutchen, 1978).

Domestic sheep are vectors of bighorn diseases such as sinusitis, which is lethal to most bighorn, particularly rams. Domestic sheep graze on the Ohaco allotment.

The population trend for bighorn in the EIS area may be sightly up due to recent years of above-average rainfall (Ough and Miller, 1980).

Javelina

Javelina occur throughout the planning area, are believed to occupy most habitat types, and are dispersing ito new ranges and building new subpopulations (Ough and Miller, 1980l). Javelina compete less with burros and livestock than do other big game because javelina eat different forage. Javelina are known to eat prickly pear cactus, acorns, berrries, mesquite beans, succulents, and forbs. No limiting habitat factors are affecting their population.

WATERFOWL AND SHOREBIRDS

Twenty-one species of waterfowl and 36 species of shorebirds routinely use aquatic habitats in the planning area. Nearly all are migrants whose numbers peak during spring and fall migrations. Alamo Lake, stock reservoirs, and riparian areas along the Hassayampa, Bill Williams, and Santa Maria Rivers make up the major waterfowl and shorebird habitats. Many stock reservoirs, however, dry up in late spring and summer or do not have enough bordering plant cover to provide nesting habitat. Some stock reservoirs would provide good waterfowl habitat if allowed to develop shoreline cover.

In a cooperative agreement between the Army Corps of Engineers and the Arizona Game and Fish Department (AG&FD), the Ocotillo Wildlife Area surrounding Alamo Lake was designated, partly to allow for waterfowl management. AG&FD habitat improvement plans, however, have not been implemented due to conflicts with wild burros and BLM grazing programs.

Most of the aquatic habitats provide only resting areas for migrant species, since the condition of shoreline vegetation and vegetation around reservoirs is unsatisfactory (BLM, 1981a).

UPLAND AND SMALL GAME

Three species of upland game birds occur in the EIS area: Gambel's quail, mourning dove, and white-winged dove. Gambel's quail are abundant in the paloverde, desert shrub, and grassland vegetation types. Few factors limit Gambel's

quail populations in the EIS area. Though not greatly dependent on water, quail do benefit from its increased availability.

Food for quail mainly depends on rainfall. If little rainfall results in few annuals, livestock use of the green plant material limits quail reproductive success (Gallizioli, 1960). Needed cover is lacking around most waters in the EIS area, exposing Gambel's quail to greater predation.

Mourning and white-winged doves occur throughout the EIS area. White-wings concentrate along riparian drainages, where their numbers appear to be declininng with the deterioration of the riparian habitat (Cottam and Trefethen, 1968).

Small game in the planning area is dominated by the desert cotton tail and black-tailed jackrabbit.

NONGAME

Ten nongame fish, 64 reptiles and amphibians, 66 nongame mammals, and 180 nongame birds are known to use the planning area. About half these species use the area year round, whereas many birds use it in winter or summer or only during migration. The riparian, Joshua tree, and paloverde vegetation types supply habitat to the greatest diversity of nongame wildlife (BLM, 1981a). The grassland and chaparral vegetation types dramatically differ in wildlife assemblages.

The major limiting factor to many nongame species in the EIS area is cover (Jones and Porzer, in preparation; Millsap, 1981; Taylor and Walchuck, 1980). Each nongame species requires a different set of cover needs of living (vegetation) and nonliving (soil and rock) materials. Sufficient cover less than 15 inches high is a habitat requirement for at least half the area's nongame species (BLM, 1981a), but 1,340,150 acres or 97 percent of public lands in the EIS area lack this important structural component. Riparian vegetation lacks all but the tallest components of vegetation structure, placing it in the poorest of habitat conditions for wildlife when compared to its potential.

Water is an important limiting factor for some nongame species. Amphibians and fish depend on water and are generally restricted to the major riparian areas, springs, stock tanks, and canyons, including Peoples Canyon and the Hassayampa and Santa Maria Rivers. Most of the waters in the EIS area are in fair to poor condition for aquatic wildlife.

PROTECTED AND SENSITIVE WILDLIFE

Federally Listed

The EIS area contains two federally listed endangered species — the bald eagle and the peregrine falcon. The endangered bald eagle winters in moderate numbers (usually less than 20) along the Bill Williams and Santa Maria Rivers. It preys primarily on fish, which are affected by water removals and contamination of the aquatic habitat. Roost trees and perching sites are usually old decadent cottonwoods, many of which are not being replaced due to excessive grazing (Millsap, 1971). The endangered peregrine falcon is a rare migrant through the EIS area. A study by David Ellis (Contract No. 16-928-CA, USDA Forest Service, Rocky Mountain Forest and Range Experimental Station) of breeding peregrine falcon sites in Arizona found no peregrines breeding in the EIS area, although it found potential sites along the major drainages.

State Listed

The twelve species listed by the Arizona Game and Fish Department (AG&FD) that occur or may occur in the EIS area are shown in the following table.

ARIZONA STATE-LISTED WILDLIFE OCCURRING IN THE EIS AREA

Group II.	Species or subspecies in danger of being eliminated from Arizona.
	Peregrine Falcon *(Falco peregrinus anatum)*
	Gilbert's Skink *(Eumeces gilberti)*
Group III.	*Species or subspecies whose status in Arizona may be in jeopardy in the foreseeable future.*
	Spotted Bat *(Euderma maculata)*
	Great Egret *(Casmerodius albus egretta)*
	Snowy Egret *(Egretta thula brewsteri)*
	Black-crowned Night Heron *(Nycticorax nycticorax hooactle)*
	Zone-tailed Hawk *(Buteo albonotatus)*
	Black Hawk *(Buteogallus a. anthracinus)*
	Desert Tortoise *(Gopherus agassizi)*
	Gila Monster *(Heloderma suspectum)*
Group IV.	*Species or subspecies of special interest because of limited distribution in Arizona.*
	Mississippi Kite (Ictinia misisippiensis)
	Sonoran Mountain Kingsnake *(Lampropeltis pyromelana)*

The spotted bat may occur near the Hassayampa or Santa Maria Rivers, although no records exist of its occurrence in the area.

The black hawk is a peripheral species in Arizona, restricted to riparian habitats along perennial streams. In this EIS area, black hawks nest on tributaries of the Hassayampa and Santa Maria drainages.

Several habitat factors limit black hawks and other species in the area. Stands of old cottonwoods and other black

Broadleaf Tree Reproduction Is Important to Wildlife and Livestock

These majestic old cottonwood trees are a haven for wildlife in riparian areas and provide food, shelter, and nesting. Livestock also congregate in these areas for shade and water. As the old trees die, the lack of younger, replacement trees will lead to a decline in the value of the habitat. BLM proposes to restore these areas under four of its alternatives.

hawk nesting trees are decaying and not being replaced because livestock and burros eat and destroy cottonwood, willow, and ash seedlings. In addition, black hawks prey mostly on fish and amphibians, which fluctuate with changing water quantity in steams. Mines in the area also take water from some of these perennial drainages and release contaminated water into the same svstems, adversely affecting habitat quality and prey base (Kepner, 1981; Millsap, 1981).

Zone-tailed hawks are uncommon nesters in the EIS area, feeding in upland habitats and nesting in riparian areas along streams and at springs. Their major limiting habitat factor is the lack of new trees to replace older stands used for nesting.

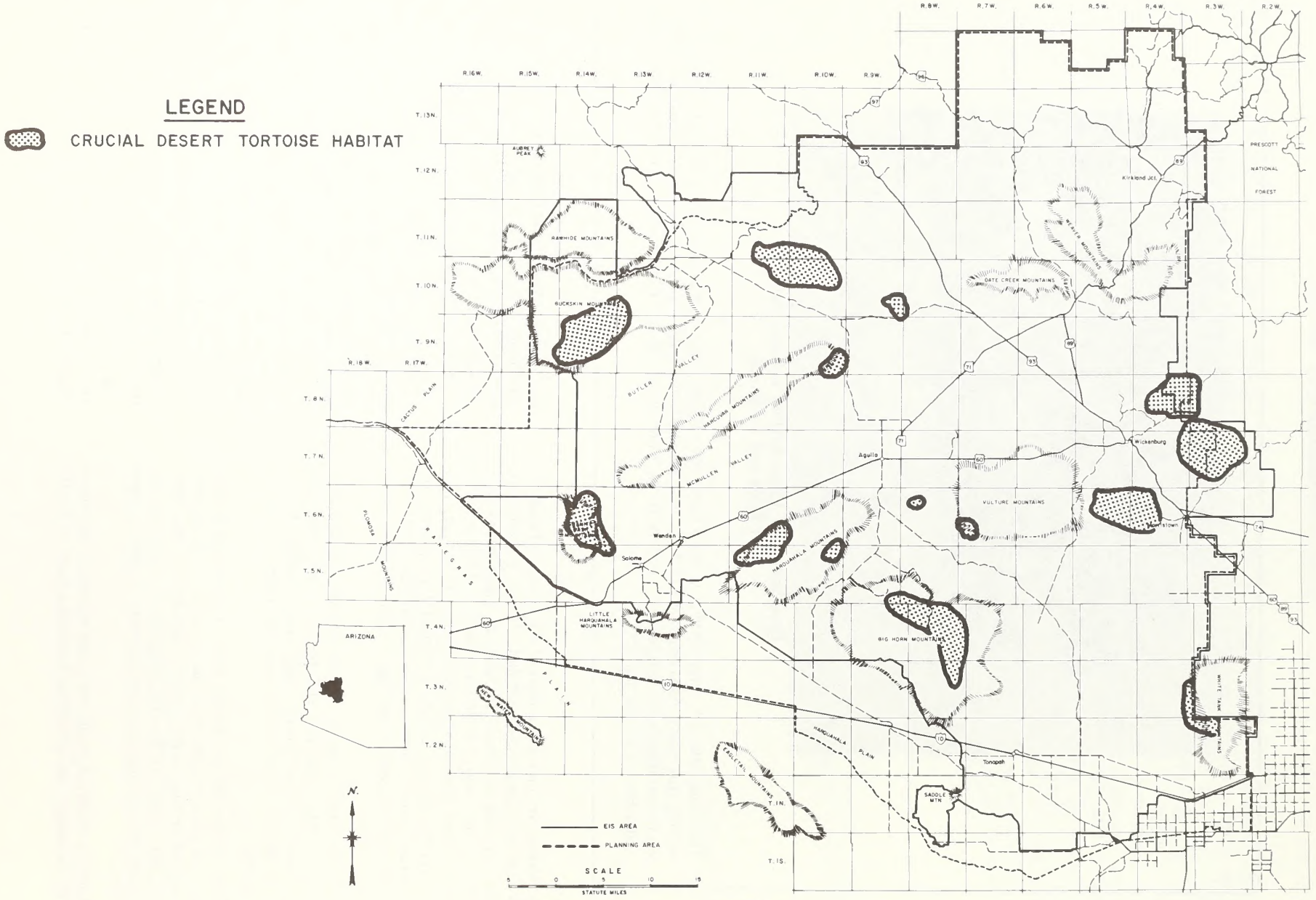
Great egrets, snowy egrets, and black-crowned night herons use Alamo Lake, stock tanks, and riparian habitats for migrant resting, although they may have nested there in the past (Hall, 1979). Limiting factors discussed for black hawks (food and cover) are generally similar for these species.

Gilbert's skink is a small rare lizard mainly inhabiting riparian, chaparral, and grassland vegetation types in the EIS area. Jones (1980; 1981) found that Gilbert's skinks need a great amount of cover less than 1 foot high in addition to the normal overstory vegetation. Fifty-three percent of the 37,400 acres of preferred skink habitat lacks low-level cover (mostly perennial grasses and forbs).

The desert tortoise occurs on 109,800 acres, mainly in areas designated as crucial habitat (Map 3-4, Table 3-8). The major limiting habitat factor for desert tortoises is forage. When tortoises awake from hibernation, they rely on a large harvest of winter-spring annuals to provide energy for the year's reproduction. Drought and heavy livestock use, however, lessen the supply of annuals and threaten tortoise reproduction (Berry, 1978). When annuals are not present in the spring, perennial grasses become an extremely important source of forage, and competition from grazing animals becomes even more critical (Sheppard, 1981). Historical declines in perennial grass production have compounded the problem by causing greater tortoise dependence on winter-spring annuals.

Recent studies (Schneider, 1981) in the EIS area reveal that tortoise populations are in difficulty, having not increased in the past 35 years. Most remaining populations

DESERT TORTOISE HABITAT



MAP 3-4

are dominated by old individuals. Populations are mostly male, since females often die during drought or when they cannot get enough forage to provide energy for subsistence and reproduction. At present rates, populations studied in Arizona will suffer 25 percent reductions in 15-20 years and may all die out in 50-75 years (Schneider, 1981).

The Gila monster occurs throughout the EIS area but is more prevalent in desert shrub and chaparral and slightly rarer in paloverde habitats (Jones, 1981). Limiting factors for Gila monsters are similar to those for the Gilbert's skink due to the Gila monster's prey needs.

The Mississippi kite has been spotted along Centennial Wash and the Hassayampa River, though no breeding habitat has been documented (Millsap, 1981).

The Sonoran mountain kingsnake occurs in the chaparral and pinyon-juniper vegetation types of the Weaver Mountains near springs and intermittent drainages. The kingsnake requires downed litter, low shrubs, and grass cover (also used by its prey) under a taller relatively dense canopy of trees (BLM, 1981a). Trampled spring sites, trails along drainages, and the lack of low shrubs and grasses limit the Sonoran mountain kingsnake.

BLM Sensitive Species

BLM maintains a list of sensitive wildlife species, which are species likely to be federally or state-listed if habitat trends are not reversed. Included on the list are the following planning area residents: kit fox, ferruginous hawk, goshawk, sharp-shinned hawk, Cooper's hawk, golden eagle, prairie falcon, merlin, Harris' hawk, desert night lizard, and desert rosy boa. Grazing in the EIS area is not likely to significantly affect the desert rosy boa, desert night lizard, kit fox, goshawk, golden eagle, merlin, or Harris's hawk.

The ferruginous hawk winters and may breed in the area. It is relatively tolerant of habitat disturbances but requires a savanna-like grassland aspect, abundant rodent prey more likely found with fair condition grassland, and relatively undisturbed sites for nesting and roosting (Call, 1978; Sherrod, 1978).

Sharp-shinned and Cooper's hawks nest and forage in riparian, pinyon-juniper, and chaparral habitats but do not reproduce well in riparian habitats extensively used by livestock (Millsap, 1981).

Prairie falcons prefer foraging in creosotebush and paloverde-saguaro range sites in fair to poor range condition. These habitats reflect prey abundance (some small mammals and birds) in overgrazed areas and greater ease in hunting where less protective cover exists (Millsap, 1981).

Habitats having the most state-listed and BLM sensitive species are chaparral, riparian, and paloverde-saguaro.

RIPARIAN HABITAT

Riparian habitats are the most productive in the EIS area. A riparian plant community or plant association is one that occurs in or next to a drainageway, floodplain, or spring and whose species or life forms differ from those of the immediately surrounding vegetation (Lowe, 1964). Riparian habitats are associated with perennial and intermittent streams, washes, and reservoirs and include 2,100 acres of broadleaf riparian vegetation and 9,000 acres of mesquite wash, less than 1 percent of public lands in the EIS area. Map 3-2 shows major riparian habitats on public lands. Table 3-8 shows which allotments have riparian habitat.

Jahn and Trefethen (1972) stated "regardless of species, riparian vegetation is the most valuable wildlife habitat in Arizona." These areas are oases in the desert for wildlife. Spring and riparian habitats not only provide a water source for many land animals but are extremely important as production areas of invertebrates, which are prey for fish, frogs, and lizards, which are prey for snakes and birds, which in turn are prey for carnivorous mammals and birds of prey (Thomas, Maser, and Rodiek, 1979). Without woody plant cover provided by broadleaf cottonwood, willow, and ash trees in these riparian areas, many wildlife species would not inhabit the EIS area.

Virtually all broadleaf riparian habitats in the planning area are deteriorated, producing far below their potential. Livestock and wild burros are trampling soil and succulent forbs and are browsing and trampling cottonwood, willow, and ash seedlings. Eliminating tree seedlings prevents the replacement of mature trees, which are the basis for the richness of the riparian resource. Old and decadent riparian trees are not being replaced by young ones, resulting in the imminent decline and possible elimination of many protected and sensitive animals. Most of the broadleaf riparian habitat is showing a downward trend.

Rangeland condition and trend and wildlife habitat condition and trend reflect different vegetation characteristics in the riparian type. Habitat condition is based more on age classes of trees and the extent of a multi-layered vegetation profile, whereas rangeland condition is based mainly on the percent of plant species present in relation to the climax condition.

Resource conflicts in riparian habitats and along the Bill Williams drainage resulted in MFP recommendations for designation as areas of critical environmental concern (ACECs).

Wild Burros

The EIS has four recognized burro use areas and one area where burros were not found at the time the Wild Free-

Wild Burro Herds Roam Part of EIS Area

Colorful and noisy, wild burro herds roam public lands around Alamo Lake and in three other areas under study. BLM is responsible for managing the herds to maintain healthy populations and to prevent resource degradation. The dark burro above wears a collar that aids BLM in tracking movement.

Roaming Horse and Burro Act was passed (December 15, 1971). Burros roam on all or part of 21 allotments (Map 3-5) and may be foraging over 420,000 acres of public land.

The management of the burro use area (Desert Hills "A" allotment) in the southeasternmost part of the EIS area — part of the Lake Pleasant Herd Unit — will be considered in a later EIS for the Phoenix Resource Area. An estimated 10 burros in that allotment have been included in the overall burro population figures for the allocation of forage.

Rangeland condition within the five burro use areas varies by area. The Alamo area is generally in poor condition within 2 miles of the Bill Williams and Santa Maria Rivers.

PRODUCTIVITY

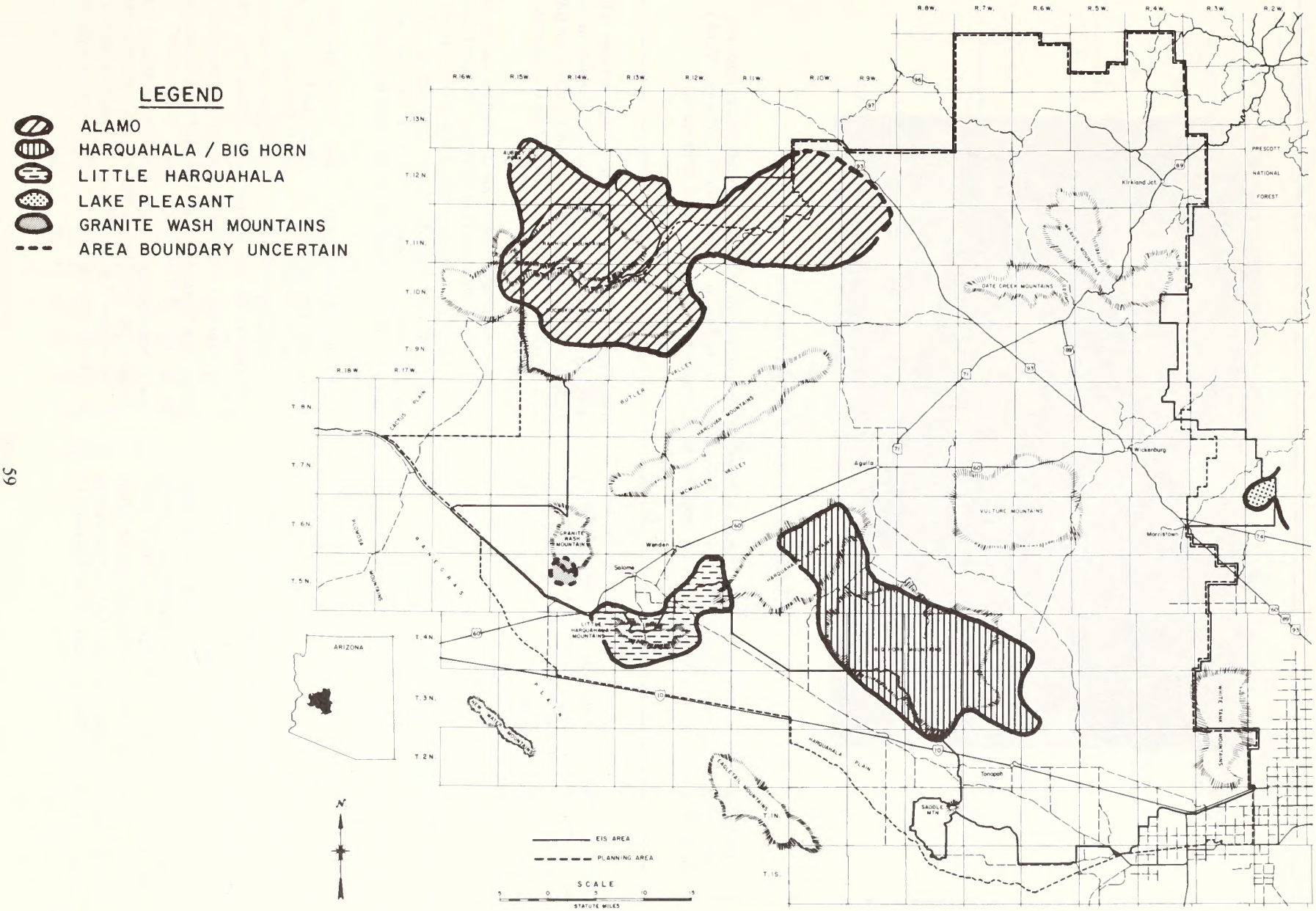
Using the Lincoln Index Inventory Method in 1976 and 1980, BLM estimated that 450 burros inhabit the EIS area. Burros in western Arizona have no specific breeding or foaling season (Ohmart, 1979). Ohmart estimates that EIS area burro populations increase at a rate of 20-25 percent every 18 months or 13-17 percent annually. This estimate, however, may be somewhat high, since it does not consider mortality. A more realistic annual rate of increase would be in the range of 9-12 percent. BLM estimates that at the time it begins to implement its rangeland program (1983), the burro population will have increased to 610.

CONFLICTS

A major wild burro conflict involves competition for forage and water. The 1983 burro population is expected to consume an annual 3,660 AUMs of forage at 0.5 AUM per burro unit month and 3.5 acre-feet of water at 5 gallons a day. Water competition, the use of unassigned forage, and the tendency of burros to concentrate within 1.5 miles of water during the hot season have created pressures on the other forage and water consumers.

Wild free-roaming burros — burros that were using federal land for *all* or *part* of their habit on or before December 15, 1971 — are protected under Public Law 91-195. Only a

WILD BURRO OCCURRENCE AREAS



MAP 3-5

Prehistoric Resources Need Protection

The EIS area contains a variety of prehistoric sites such as the petroglyph (rock art) pictured above. Sites may be damaged or destroyed through erosion, vandalism, cattle trampling, or construction disturbance. BLM's rangeland program includes safeguards to preserve these resources from unnecessary destruction.

few burros using the Ekvall and Bar D 4 ranches are wild free-roaming burros, but these burros are mixed with and indistinguishable from the resident feral trespass burros on state and private land to the east. Thus all burros on these ranches are protected under federal law.

Cultural Resources

The analyses and conclusions concerning cultural resources in this EIS are based upon data from several levels of inventory. BLM has recently conducted an existing data inventory (Class I) of west-central Arizona, which identified 331 sites in the EIS area. In June 1981, BLM completed a field sample inventory (Class II) of the EIS area using a 1 percent sample to gather data for planning documents and this EIS. Because of funding limitations, 89,000 acres in the eastern EIS area were not inventoried. Only 22 percent of the unsurveyed lands, however, lie within allotments classified for intensive management under the *Proposed Action.* The Class I and Class II inventories were conducted in accordance with the Programmatic Memorandum of Agreement between the BLM and the Advisory Council on Historic Preservation, dated January 14, 1980 (appendix 13). In addition, certain portions of the EIS area have received intensive project-specific inventories (Class III). These portions constitute less than 0,02 percent of the EIS area. (See Glossary for definitions of cultural resource inventory classes.)

More information about all inventories can be obtained from the BLM Phoenix District Office. Detailed discussions of the Class II inventory method are included in the Lower Gila North URA (BLM, 1981a). Site-specific information on archaeological sites is confidential, however, and will be provided only to qualified persons with legitimate research interests.

The overall site density in west-central Arizona is relatively low. On the basis of an estimated one site per 180 acres, the EIS area could contain 9,500 sites. Site density and distribution of known cultural resources vary across the EIS area as shown in Appendix 11 and Map 3-6.

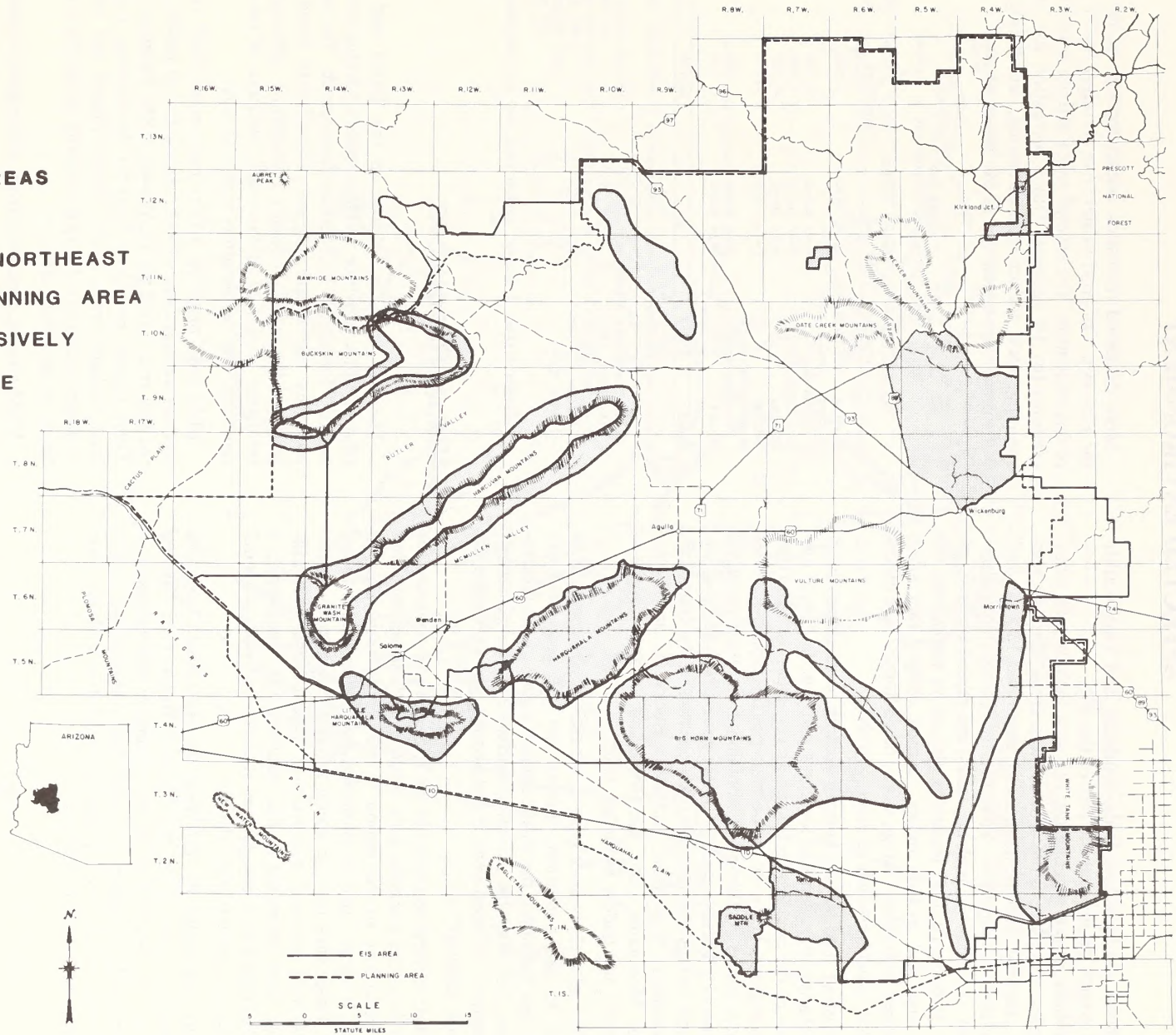
The culture history of the region is summarized in the Lower Gila North URA(BLM,1981a) and is also discussed by Brown and Rice (1978) and by Stone (1977). Because few archaeological projects have been conducted in western Arizona, the prehistory of the region is not well understood. Records show that the EIS area was probably used by several cultural groups, including the Prescott Culture in the

CULTURAL RESOURCES

LEGEND

SENSITIVE AREAS

NOTE: THE UPPER NORTHEAST PORTION OF THE PLANNING AREA HAS NOT BEEN INTENSIVELY INVENTORIED. DATA ARE INCOMPLETE AND REFLECT FEDERAL LANDS ONLY.



MAP 3-6

northeast, the Hohokam in the southeast, and Yuman affiliated groups throughout the rest of the area.

Prehistoric site types in the EIS area include rock rings, quarries, extensive lithic procurement areas, ceramic scatters, chipping stations, habitations, campsites, hilltop "fort" structures, roasting pits, water control features, rock alignments, rockshelters, rock art, trails, and mixed artifact scatters. Historic cultural resources also occur throughout the EIS area and include mines, mining camps, mill sites, pipelines, cemeteries, stage stops, ranch houses, and ranch-related structures such as stone corrals.

Existing data are not precise enough to establish direct correlations between site locations and specific single elements of the environment, such as vegetation or soil type. Data suggest, however, that certain physiographic localities have a higher likelihood of containing significant cultural resources. These sensitive areas generally include areas around springs and bajadas; open canyons in the Harcuvar, Harquahala, Big Horn, Belmont, Buckskin, and White Tank Mountains; and the Anderson Mine, Congress/Stanton, and Saddle Mountain areas.

The cultural resource base in the EIS area is generally in good to fair condition, having not yet been severely impired. Erosion is the most common source of site deterioration, followed by animal disturbance (rodents, cattle), vandalism, off-road vehicle disturbance, and developments (roads, mining).

Most cultural resources in the EIS area are important for their potential scientific uses, since so little is known about the prehistory of the region. Certain significant sites or areas, however, may be protected and conserved for future use. Other sites may be useful for studying impact trends. Sites with potential sociocultural (see Glossary) significance were identified in the southern EIS area during a study of the Palo Verde-Devers powerline corridor (Cultural Systems Research, Inc., 1978).

One site within the EIS area, the Harquahala Peak Observatory, is listed on the National Register of Historic Places. As specified in the Programmatic Memorandum of Agreement (Appendix 13), BLM has evaluated the Class I and Class II inventory results in consultation with the State Historic Preservation Officer.

Recreation

Most of the EIS area is relatively remote and sparsely populated. Concentrated visitor use is predominant in areas developed specifically for recreation. Developed areas within or adjoining the EIS area include Alamo Lake State Park on the Bill Willliams River, White Tank Mountain County Regional Park, and the Vulture Mine. Concentrated visitor use of short duration also occurs when off-road vehicle events are authorized on public land.

More dispersed recreation occurs throughout the rest of the EIS area. Off-road vehicle use accounts for 77 percent of this recreation. The second major activity is hunting, accounting for 18 percent. Other recreation use includes camping, rock collecting, sightseeing, and hiking. Table 3-9 summarizes visitor use in the planning area.

TABLE 3-9
ESTIMATED VISITOR USE

Recreation Activity	Primary Season of Use	Total Visitor Days/Year	Percent of Total
Hunting - Big Game	Fall, Winter	3,500	5
Hunting - Small Game/ Upland Game	Year Round	10,200	13
Rock Collecting	Year Round	800	1
ORV Uae	Year Round	59,350	77
Camping	Fall, Spring	1,900	2
Sightaeeing within Planning Area	Year Round	800	1
Other*	Year Round	150	< 1
Total		76,700	100

Visitor use for the following developments is not shown above.

Alamo State Park & Reservoir (Baldwin, 1981)	120,000	Visitor Days Per Year
White Tank Mountain County Regional Park (Gillmore, 1981)	90,000	Visits Per Year
Vulture Mine	7,000	Visitors Per Year

* Includes hiking, trapping, backpacking, and bird watching.

Visual Resources

The EIS area is located in the Basin and Range physiographic province and has scenery varying from striking cliff formations to Sonoran desert scrub. The area's topography varies from rugged mountains to broad plains. Much of the area is virtually undisturbed, although major intrusions consist of access roads, evidence of mining and ranching, and public utility rights-of-way.

BLM land planning efforts have established visual resources management (VRM) classes for all public lands in the EIS area, using the BLM 8400 VRM Planning Manual. These classes provide a basis for determining a proposed land management activity's visual impact and mitigating measures required to bring the activity within the acceptable limits of the VRM class.

VRM classes, their objectives, and required management practices are as follows.

Class I — Class I provides primarily for natural, ecological changes only. It is applied to primitive areas, some natural areas, and similar situations where management activities are to be restricted.

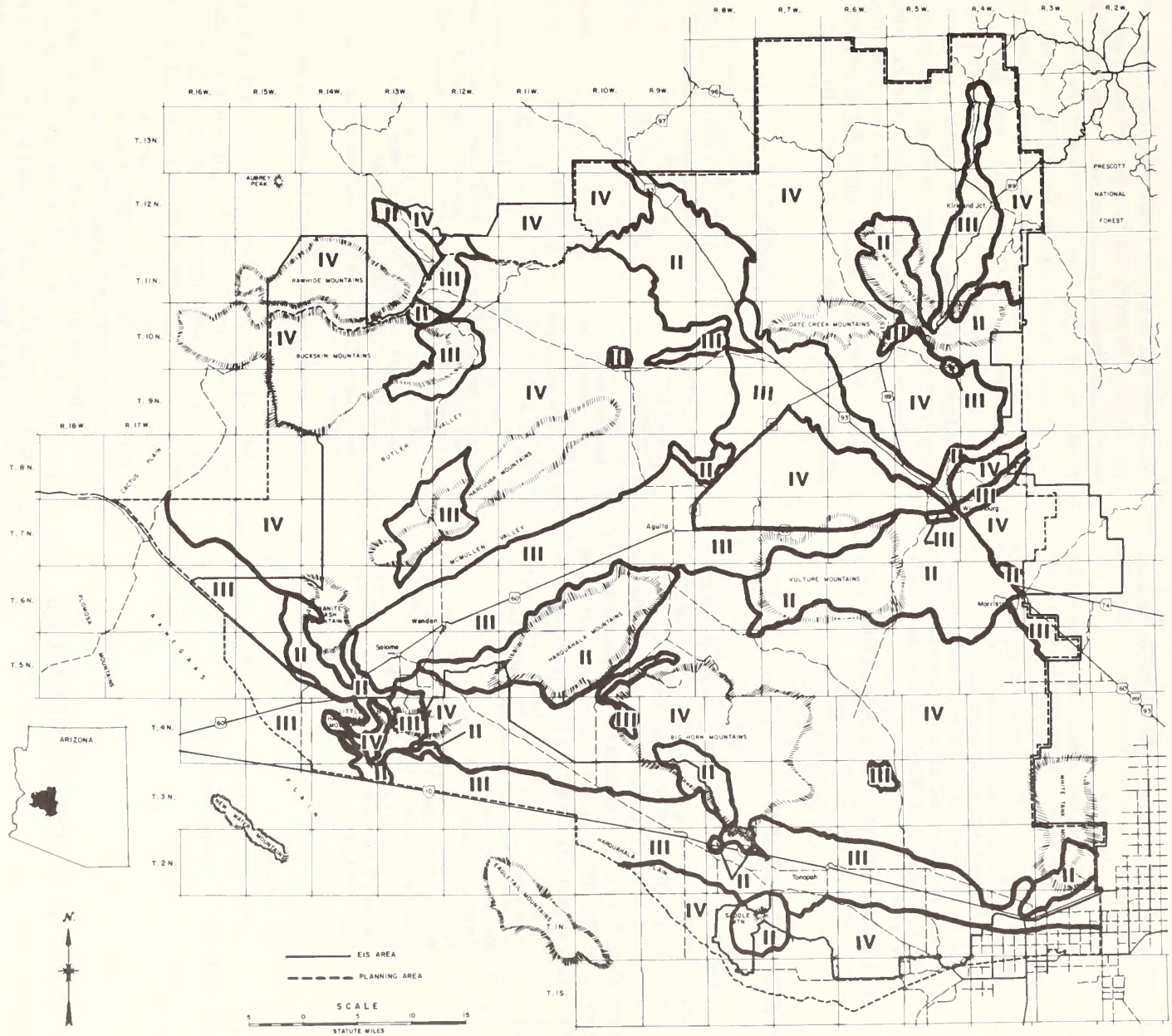
Class II — Changes in any of the basic elements (form, line, color, or texture) caused by a management activity should not be evident in the characteristic landscape.

Class III —Changes in the basic elements caused by a management activity may be evident in the characteristic landscape, but the changes should remain subordinate to the visual strength of the existing character.

VISUAL RESOURCES

LEGEND

I	CLASS I
II	CLASS II
III	CLASS III
IV	CLASS IV
V	CLASS V



MAP 3-7

Class IV —Changes may subordinate the original composition and character but must reflect what could be a natural occurrence within the characteristic landscape.

Classs V —Change is needed. This class applies to areas where the naturalistic character has been disturbed to a point where rehabilitation is needed to bring it back into character with the surrounding countryside. This class would apply to areas identified in the scenery evaluation in which the quality class has been reduced because of unacceptable intrusions. It should be considered an interim short-term classification until one of the other objectives can be reached through rehabilitation or enhancement. The desired visual quality objective should be identified.

VRM classes for the EIS area are shown on Map 3-7.

Wilderness Values

The Federal Land Policy and Management Act of 1976 mandates an inventory of all roadless areas of 5,000 acres or more that have wilderness characteristics as described in the Wilderness Act of 1964. Completed in November 1980, the inventory phase of BLM's wilderness review resulted in the establishing of the following 13 wilderness study areas (WSAs) totally or partially within the EIS area (Map 3-8).

Unit No.	Unit Name	Public Acres
2-58*	Rawhide Mountains	62,300
2-59*	Arrastra Mountainns	113,650
2-68	Peoples Canyon	3,480
2-71*	Buckskin Mountains	47,582
2-75	Harcuvar Mountains	74,778
2-83*	Hassayampa River Canyon	21,900
2-95*	Harquahala Mountains	73,875
2-99*	Big Horn Mountains	22,337
2-100	Hummingbird Springs	67,680
2-135*	Saddle Mountain	5,500
2-204	Ives Peak	9,665
2-205	Tres Alamos	8,910
5-15A*	Swansea	41,690

***A portion of the WSA lies outside the EIS area.**

Economic and Social Conditions

ECONOMIC CONDITIONS

Ranch Budgets

Because specific information does not exist for each ranch in the EIS area, typical ranch budgets had to be developed for analyzing the financial condition of ranches. In describing and analyzing ranch operations, this section of the EIS uses livestock numbers for federal, state, and private land to present a complete overview of how BLM proposals would affect ranch economics. To help develop ranch budgets, the 33 ranches in the EIS area that would be affected by the various alternatives were divided into three groups by herd size: 0-99 cows (48 cows typical), 100-199 cows (129 cows typical), and more than 200 cows (460 cows typical). With the help of EIS area ranchers, BLM range specialists and economists developed ranch budget data representative of each size class. The Economic Research Service, U. S. Department of Agriculture, then used these data to develop income statements for each class. The income statements are shown in Table 3-10.

TABLE 3-10
REPRESENTATIVE RANCH INCOME STATEMENTS

Item	Ranch Size Small (48 Head)	Medium (129 Head)	Large (460 Head)
Revenue[1]	$9,032	$23,064	$71,063
Cash Costs[2]	3,730	10,971	37,251
Net Revenue	$5,302	$12,093	$33,812
Non-Cash Expenses			
Owner-Operator Labor[3]	$1,317	$ 3,790	$12,000
Depreciation[4]	1,386	3,956	13,698
Total Non-Cash Expenses	$2,703	$ 7,746	$25,698
Net Income[5]	$2,599	$ 4,347	$ 8,114

1 Revenue derived from the sale of calves, yearlings, and cull cows.
2 Cash costs include grazing fees, supplemental feed, veterinary expenses, marketing costs, labor costs, fuels and repairs, insurance, interest expenses, and taxes.
3 Owner-operator labor is calculated at $4.04 per hour.
4 Depreciation is calculated using the following formula:

$$\frac{\text{Present Cost - Salvage Value}}{\text{Estimated Life}}$$

5 Net Income = Revenue - Cash Costs, Owner-Operator Labor, and Depreciation

Source: Economic Research Service, U. S. Department of Agriculture.

Although the terms "representative" and "typical" are used, the EIS-area ranches have differing characteristics that may cause their financial situations to differ from the typical income situations depicted in this analysis. For example, revenue from sporadic sheep grazing on four allotments is not included in the analysis because it is not typical of the ranches operating in the EIS area and because it greatly fluctuates year to year. Also, many economic factors will influence the amount of net revenue earned on these ranches. Recently, the large increase in interest rates has increased the operating costs of ranches that borrow money to cover operating costs. Another factor affecting net revenue is the price for which ranchers sell their cattle. Cattle prices used in the ranch budgets depicted in this EIS reflect the average price received by ranchers from 1977-79. BLM economists felt that the 3-year averages in this analysis are probably a fair estimate of the expected average cattle prices over the next few years. Fluctuations in the cattle market and the rate of inflation will greatly affect the prices received by producers. Detailed information on ranch budg-

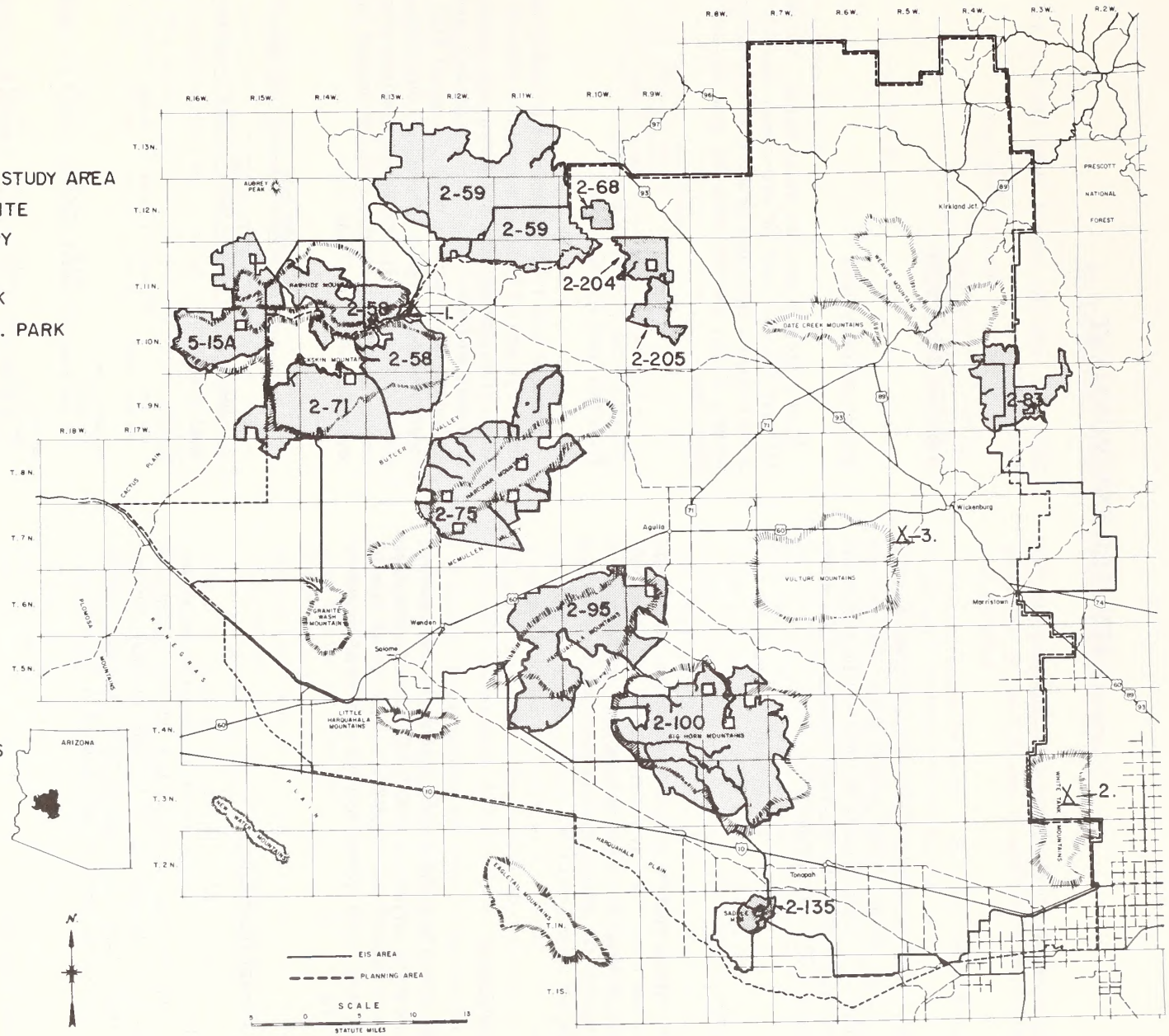
ESTABLISHED WILDERNESS STUDY AREAS AND DEVELOPED RECREATION SITES

LEGEND

- DESIGNATED WILDERNESS STUDY AREA
- DEVELOPED RECREATION SITE
- PLANNING AREA BOUNDARY
- EIS AREA BOUNDARY
- 1. ALAMO LAKE STATE PARK
- 2. WHITE TANK MTN. CO. REG. PARK
- 3. VULTURE MINE

ESTABLISHED WILDERNESS STUDY AREA

UNIT NO.	UNIT NAME
2-58	RAWHIDE MOUNTAINS
2-59	ARRASTRA MOUNTAINS
2-68	PEOPLES CANYON
2-71	BUCKSKIN MOUNTAINS
2-75	HARCUVAR MOUNTAINS
2-83	HASSAYAMPA RIVER CANYON
2-95	HARQUAHALA MOUNTAINS
2-99	BIG HORN MOUNTAINS
2-100	HUMMINGBIRD SPRINGS
2-135	SADDLE MOUNTAIN
2-204	IVES PEAK
2-205	TRES ALAMOS
5-15A	SWANSEA



MAP 3-8

eting is included in the Lower Gila North Planning Area Analysis (BLM, 1981b).

Small Ranch

The typical small ranch has a base herd of 48 cows and earns a net revenue (gross revenue minus cash costs) of $5,302. Subtracting a charge for owner-operator labor and depreciation reveals that the small operator earns a yearly net income of $2,599 (Table 3-10).

Medium-Size Ranch

The typical medium-size ranch has a base herd of 129 cows and earns a yearly net revenue of $12,093. Subtracting a charge for owner-operator labor and depreciation reveals that the typical medium-size operator receives a yearly net income of $4,347.

Large Ranch

The typical large ranch has a base herd of 460 cows and earns a yearly net revenue of $33,812. Subtracting a charge for owner-operator labor and depreciation reveals that the typical large ranch operator receives a yearly net income of $48,114.

Ephemeral Operations

Although little information exists about ephemeral grazing in the EIS area, such grazing is believed to contribute somewhat to the earnings of EIS-area ranchers. Because this income source is so unpredictable, no costs or returns from ephemeral operations are included in this analysis.

Ranch Finance

The rancher's ability to borrow money is determined by many factors, including current assets, current liabilities, and the ranch's profitability. The market value of ranches in the EIS area is generally based on the ranch's authorized grazing preference in AUMs. The estimated market value of an AUM is $125 or $1,500 per cow yearlong (Durfee, 1981). Although BLM does not recognize the right to treat grazing permits as real property, these permits are bought and sold and used as collateral for loans.

Based on current authorized grazing preference, the value of the typical small ranch in the EIS area amounts to $85,500. The typical medium-size ranch is valued at $229,500, and the typical large ranch is valued at $1,020,000.

Regional Economics

Economic Study Area

Most of the EIS area lies within Yuma, Yavapai, and Maricopa Counties, and the three-county area was chosen as the economic study area for this EIS. Although a part of Mohave County also lies in the EIS area, this area is relatively small.

Range Livestock-Related Receipts, Expenses, and Net Revenue

Estimated total 1979 receipts from the sale of livestock for the EIS area's 33 ranches amounted to $996,655 (Table 3-11). Thus area ranchers contributed 0.32 percent to the total value of livestock and livestock products sold in the study area, amounting to a yearly average of $308 million between 1974 and 1979 (Arizona Crop and Livestock Reporting Service, 1981). Operating expenditures for the 33 ranches in 1979 amounted to $497,189, leaving a total net revenue of $499,466 (Table 3-11).

TABLE 3-11
TOTAL ANNUAL RANCH RECEIPTS, EXPENDITURES, AND REVENUE

Item	Ranch Size			EIS Area Total
	Small	Medium	Large	
Number of Ranches	14	10	9	33
Receipts				
Per Ranch	$ 9,032	$ 23,064	$ 71,063	—
EIS Area Total*	126,448	230,640	639,567	$996,655
Expenditures*				
Per Ranch	3,730	10,971	37,251	—
EIS Area Total*	52,220	109,710	335,259	497,189
Net Return				
Per Ranch	5,302	12,093	33,812	—
EIS Area Total*	74,228	120,930	304,308	499,466

* Represents the per ranch figure multiplied by the number of ranches in each size class.

Source: Lower Gila North Ranch Budgets.

Ranch labor requirements in 1979 for the 33 ranches amounted to 23 workyears. (A workyear equals 2,600 hours of labor. Thus, labor for two persons working 1,300 hours each would equal 1 full workyear.) Earnings from these 23 workyears in 1979 amounted to $242,422 (assuming $10,500 per workyear) or less than 1 percent of the study area's agriculture-related employment income (Table 3-12).

TABLE 3-12
RANCH EMPLOYMENT AND INCOME

Item	Ranch Size			EIS Area
	Small	Medium	Large	Total
Number of Ranches	14	10	9	33
Paid Labor Requirements (Hours per Year)[1]				
Per Ranch	336	1,352	4,695	
EIS Area Total	4,705	13,520	42,258	60,483
Employment (Workyears - 1 Workyear = 2,600 hours)[1,2]				
Per Ranch	0.13	0.52	1.81	
EIS Area Total	1.81	5.20	16.25	23.26
Earnings ($10,500 per Workyear)[3]				
Per Ranch	$ 1,366	$ 5,462	$ 19,012	
EIS Area Total	19,012	54,620	170,690	$244,427

[1] Includes both family labor and hired labor.
[2] Workyears are calculated by dividing the hourly labor requirements by 2,600 hours; 1 workyear = 2,600 hours.
[3] Earning are calculated by multiplying estimated workyear requirements by income per workyear ($10,500).

Construction and Recreation

The construction industry provided $1 billion in earnings to residents of the study area in 1979 (Valley National Bank of Arizona, 1980). Recreation income is partially reflected in the services and retail trade sectors, which in 1979 provided $3.7 billion in earnings to study area residents (Valley National Bank of Arizona, 1980).

Public Finance and Tax Base

In 1979 the assessed valuation of ranches in the study area amounted to less than 1 percent of the total economic study area valuation of $3.9 billion (Arizona Office of Economic Planning and Development, 1980).

SOCIAL ATTITUDES AND VALUES

Diversity is a major characteristic of the social composition of the EIS area, as is evident in the varied size and population of the towns and communities in and near the area. For example, Tonopah, in the area's southeast is a construction boom town with a rapidly growing population. Wenden, centrally located in the EIS area, is a small farm and ranch town with a stable population. And Quartzsite, 20 miles west of the EIS area, is a haven for thousands of winter visitors.

Diversity is also reflected in the economic bases of the towns and communities. Retirement and tourism are important in Wickenburg. Agriculture is the economic foundation of towns such as Buckeye, Wenden, Aguila, and Bouse. Construction of the Palo Verde nuclear generating plant and the Central Arizona Project has strongly influenced the economy of Tonopah, Wintersburg, and Salome. And the potential of large-scale residential development associated with the growth of the Phoenix metropolitan area has already affected communities in the White Tanks-Agua Fria region on the area's eastern periphery. In contrast, Brenda and Vicksburg, in the western EIS area have suffered extreme commercial losses with the 1976 opening of Interstate Highway 10.

Population and demographic data for the area also show a broad diversity. A large proportion of the Wickenburg and Salome populations consists of retired persons. Quartzsite is unique in its seasonal population. Tonopah is dominated by hundreds of construction workers who live in the mobile home park and company dormitory built for their use.

Land use-related attitudes and values of the planning area residents are also diverse. This diversity was clearly found in a survey based on informal discussions with residents of most of the towns in and near the area. Many of those contacted, for instance, spoke favorably about local control over land use decisions, but some strongly contended that federal agencies, such as the BLM, should have more control over lands in the area. Some defended local control as a "constitutional right," as a means to spur development, and as a way of lowering taxes. Others cited stronger federal control as essential for protecting land, vegetation, and wildlife in the area.

Most people surveyed favorably viewed the use of public lands for livestock grazing. A few, however, objected and mentioned that grazing should be restricted to private lands. Most residents knew something about BLM, but the extent of their knowledge varied. Residents relatively new to the area and not closely associated with rural activities were the least likely to be aware of BLM.

Only a few of the people surveyed were aware of BLM's plans to prepare this EIS, possibly because those interviewed were not a statistically valid representation of the area's population. On the other hand, this lack of awareness may reflect the diversity of the area's social composition.

Chapter 4

ENVIRONMENTAL CONSEQUENCES

CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

Introduction

Chapter 4 discusses the environmental consequences of the alternatives including the *Proposed Action,* analyzing each environmental component at a depth appropriate for the degree of expected impact. The EIS team determined that none of the alternatives would measurably impact geology, minerals, air quality, climate, topography, or urban land use. These elements are thus not discussed in this chapter.

Chapter 4 also identifies measures that might be used to reduce or eliminate adverse environmental impacts. These measures would be applied in addition to those already made part of the alternatives and described in Chapter 2.

Basic Assumptions

BLM made the following assumptions to aid in measuring the impacts of the alternatives.

1. BLM will have the funding and personnel to implement the proposal or any alternative.

2. Alternatives selected will be fully implemented as described.

3. Monitoring and studies will be conducted as described. Consistent with applicable regulations, use or management will be adjusted when studies show a need.

4. Measures for resource protection and enhancement listed in Chapter 2 will be fully implemented.

5. Except under the *No Action* alternative, utilization of key forage species across each allotment will not exceed an average of 50 percent unless otherwise specified.

6. The EIS area has only one implemented AMP and few utilization or trend studies. The inventory data for rangeland condition, apparent trend, and other factors are the most reliable existing data. BLM acknowledges shortcomings in data gathered during a 1-year (1979-1980) rangeland inventory. As BLM receives new data from monitoring, studies, and other sources that update or supplement the inventory, it will review its rangeland management program and adjust grazing use or management as needed.

7. Big-game and wild burro population estimates reflect the most current existing data (Arizona Game and Fish Department and BLM records). If future studies significantly change these estimates, BLM will adjust forage allocations or management.

8. Short-term or temporary impacts would occur during implementation (1983 through 1989). Long-term impacts would occur 20 years after implementation is complete.

9. Where possible, the EIS analyzes impacts to federal and nonfederal lands. A lack of data on resources and livestock operations on private and state lands, however, does not allow a complete analysis. When such information is missing, the text and tables consider only federal acres.

10. Impacts of the *Proposed Action* and alternatives on nonintensive allotments in declining condition cannot be predicted, since specific BLM responses to monitoring and the extent of non-BLM mitigation are not known. The analysis thus reflects the worst-case situation of continued declines on these allotments in accordance with Council on Environmental Quality regulations. BLM's commitment to halt rangeland deterioration through sound management practices backed up by field studies and effective cooperation from federal and state agencies and affected operators should result in favorable consequences for those units.

Impacts of Proposed Grazing Management (Proposed Action)

VEGETATION

This section discusses the impacts of forage allocations, rangeland developments, and levels of grazing management on plant cover, vegetation production, ecological rangeland condition, apparent trend in rangeland condition, and key species composition. Specialists have assessed impacts using rangeland inventory data, professional judgment, and research results from comparable areas.

Intensive grazing management on 10 allotments containing 438,500 acres of public land would significantly benefit vegetation. Vegetation on 16 allotments containing 398,600 acres proposed for less intensive management would improve or remain the same. These allotments are not deteriorating and do not require management changes. Vegetation on the remaining 53 allotments containing 555,900 acres would continue to follow present trends under nonintensive management.

Vegetation production would increase as a result of implementing intensive grazing systems, building rangeland developments, and maintaining moderate utilization of key forage species (40 to 60 percent). Currently improving areas with high productive potential would improve most rapidly.

Production would increase 5 percent from 490 million to 515 million pounds in the long term (Table 2-5). Vegetation would improve more slowly in low-response sites, where more than 20 years would be needed to realize measurable improvement.

Plant Cover

Plant cover is important in stabilizing soils and reducing wind and water erosion. Plant cover reflects such variables as soils, precipitation, and grazing or other consumptive uses. In the EIS area, cover would be most affected by grazing management changes on bottomland and upland soils in high-producing range sites.

Table 4-1 shows that under the *Proposed Action* total increases in vegetation cover would be low. Cover would improve the most in the riparian vegetation type (from 52 to 57 percent) and the least in the grassland, creosotebush, and pinyon-juniper types where little or no change is projected. Increases would occur on allotments proposed for intensive management where grazing treatments would rest plants during critical growing periods, allowing them to increase in vigor and to establish new seedlings when climatic conditions are favorable. Cover would slightly increase on less intensive and nonintensive allotments whose condition is improving but would not greatly change on allotments in stable or declining condition. Cover on deteriorating allotments would probably show little change because less desirable plants would invade the deteriorated areas.

TABLE 4-1
PRESENT AND PROJECTED PLANT COVER*
(Percent of Ground Covered by Vegetation)

Vegetation Type	Existing Situation	Proposed Action	No Action	Intensive Grazing	Seasonal Grazing**	No Livestock
Chaparral	52	56	52	58	54	59
Creosotebush	14	15	13	16	15	17
Desert Shrub	29	31	28	33	30	34
Grassland	31	32	28	32	32	34
Joshua Tree	27	29	25	30	28	31
Paloverde	26	28	24	29	27	30
Pinyon-Juniper	45	45	45	45	45	55
Riparian	52	57	47	57	55	60

* Except for the existing situation, values are for 20 years after implementation.
** Estimates for this alternative apply to the ephemeral option as well.

Rangeland Condition and Trend

Changes in rangeland condition would vary over time, depending on trend, site potential, present plant cover, natural seed sources, effectiveness of rangeland developments, climatic conditions, and level of grazing management. High-response areas with high production potential — volcanic hills, deep sands, loamy bottoms, loamy hills, clay uplands, and sand bottoms — would improve most significantly within the short term. Low-response areas — limy hills, limy uplands, and schist hills — would remain unchanged.

The *Proposed Action* would improve rangeland condition and trend on all allotments proposed for intensive grazing management by improving species composition, plant vigor, and seedling establishment. As plants preferred by livestock are relieved from continuous yearlong grazing, they would gain vigor, produce seed, reproduce, and increase in species composition. Rangeland being grazed and then rested becomes more productive as secondary succession carries the plant community to a higher ecological condition class.

Allotments under less intensive grazing now have acceptable rangeland condition and trend. Seven allotments are improving under present management and nine are stable. As rangeland condition continues to improve, BLM would monitor the impacts of livestock grazing on these allotments.

Nonintensive allotments would continue current trends under the *Proposed Action*. Eleven allotments would continue to improve, 31 would remain stable, and 10 would continue to deteriorate except where mitigation or monitoring leads to reduced grazing pressure or improved grazing management. No data exist for the White Tanks allotment. Currently deteriorating allotments would receive priority monitoring, and livestock numbers would be adjusted where warranted to prevent damage to public lands. Appendix 3 shows present condition and trend by allotment, and Appendix 6 shows projected long-term impacts to rangeland condition by alternative.

Of equal importance in improving rangeland condition is the extent to which key forage plants are grazed. To maintain desired rangeland condition or improve depleted rangeland, proper utilization of key forage plants is essential. Moderate utilization (40 to 60 percent) would reduce the adverse effects of drought on rangeland condition, allowing rangelands to recover more rapidly than if the forage had been heavily grazed before the drought (Paulsen, 1975).

Projected long-term rangeland condition acreage by vegetation type is shown in Table 4-2. Under the *Proposed Action,* areas in excellent condition would increase from 26,400 to 146,000 acres, and areas in good condition would increase from 412,500 to 552,700 acres. Areas in fair condition would decrease from 713,600 to 496,600 acres, and areas in poor condition would decrease from 222,300 to 179,500 acres.

The rate of improvement would largely depend on the current vigor and composition of the desirable plant species on the rangeland (Humphrey, 1962). Production potential and level of management would also heavily influence the rate of improvement.

On the proposed intensive grazing allotments, as rangeland condition improves through better livestock distribution, grazing system implementation, and proper utilization of key forage plants, the perennial species most sensitive to grazing - Mormon tea, bush muhly, and twinberry — would be allowed to gain vigor and increase repro-

TABLE 4-2
EXISTING AND PROJECTED RANGELAND CONDITION ACREAGE ON PUBLIC LANDS[1,2]

Vegetation Type	Poor	Fair	Good	Excellent	Total Acres
EXISTING SITUATION					
Chaparral	4,112	442	7,556	9,421	21,531
Creosotebush	108,213	181,994	102,435	1,101	393,743
Desert Shrub	611	30,699	9,448	652	41,410
Grassland	82	1,023	612	926	2,643
Joshua Tree	1,068	16,072	9,334	8,852	35,326
Paloverde	106,963	479,424	276,403	4,085	866,875
Pinyon-Juniper	0	0	1,594	549	2,143
Riparian	1,234	3,939	5,069	836	11,078
TOTALS	222,283	713,593	412,451	26,422	1,374,749
PROPOSED ACTION					
Chaparral	1,976	1,575	7,437	10,543	21,531
Creosotebush	86,151	145,125	123,297	39,170	393,743
Desert Shrub	278	24,712	12,205	4,215	41,410
Grassland	45	914	645	1,039	2,643
Joshua Tree	710	14,535	10,290	9,791	35,326
Paloverde	89,748	306,380	392,416	78,331	866,875
Pinyon-Juniper	0	0	1,517	626	2,143
Riparian	543	3,383	4,848	2,304	11,078
TOTALS	179,451	496,624	552,655	146,019	1,374,749
NO ACTION					
Chaparral	4,112	747	7,531	9,141	21,531
Creosotebush	108,213	182,405	102,124	1,001	393,743
Desert Shrub	638	30,739	9,432	601	41,410
Grassland	82	1,061	598	902	2,643
Joshua Tree	1,126	16,042	9,304	8,854	35,326
Paloverde	106,876	479,494	276,443	4,062	866,875
Pinyon-Juniper	0	0	1,604	539	2,143
Riparian	1,538	3,894	5,012	634	11,078
TOTALS	222,585	714,382	412,048	25,734	1,374,749
INTENSIVE GRAZING					
Chaparral	1,814	1,502	7,582	10,633	21,531
Creosotebush	84,152	140,550	127,994	41,047	393,743
Desert Shrub	245	24,364	12,378	4,423	41,410
Grassland	39	816	705	1,083	2,643
Joshua Tree	698	14,156	10,590	9,882	35,326
Paloverde	86,624	308,222	392,816	79,213	866,875
Pinyon-Juniper	0	0	1,495	648	2,143
Riparian	442	3,227	4,902	2,507	11,078
TOTALS	174,014	492,837	558,462	149,436	1,374,749
SEASONAL GRAZING[3]					
Chaparral	2,011	1,454	8,442	9,624	21,531
Creosotebush	85,355	147,111	122,537	38,740	393,743
Desert Shrub	282	24,989	12,292	3,847	41,410
Grassland	45	938	640	1,020	2,643
Joshua Tree	749	18,163	6,739	9,675	35,326
Paloverde	91,653	375,722	331,494	68,006	866,875
Pinyon-Juniper	0	0	1,521	622	2,143
Riparian	1,000	3,742	4,435	1,901	11,078
TOTALS	181,095	572,119	488,100	133,435	1,374,749
NO LIVESTOCK					
Chaparral	1,794	1,407	7,598	10,732	21,531
Creosotebush	83,928	140,182	128,201	41,432	393,743
Desert Shrub	239	24,298	12,398	4,475	41,410
Grassland	39	767	716	1,121	2,643
Joshua Tree	618	14,070	10,624	10,014	35,326
Paloverde	86,532	308,179	392,846	79,318	866,875
Pinyon-Juniper	0	0	1,462	681	2,143
Riparian	401	3,072	4,991	2,614	11,078
TOTALS	173,551	491,975	558,836	150,387	1,374,749

[1] Except for the existing situation, values are for 20 years after implementation.
[2] Does not include White Tanks allotment.
[3] Estimates for this alternative apply to the ephemeral option as well.

duction. Percent key species composition for each vegetation type would increase as the rangeland improves in condition class as shown in Table 4-3.

TABLE 4-3
PERCENT KEY SPECIES COMPOSITION BY
VEGETATION TYPE AND RANGELAND CONDITION

Vegetation Type	Rangeland Condition			
	Poor	Fair	Good	Excellent
Chaparral	18	23	41	44
Creosotebush	2	5	10	13
Desert Shrub	7	14	22	32
Grassland	15	31	38	49
Joshua Tree	9	12	23	30
Paloverde	3	7	13	17
Pinyon-Juniper	12	21	29	33
Riparian	2	5	8	13

Riparian Vegetation

Under the *Proposed Action,* allotments with crucial riparian habitats would be managed under intensive or less intensive grazing. Since livestock usually graze riparian zones more heavily than other rangelands, BLM would place special emphasis on monitoring utilization in these areas.

Implementing livestock grazing systems would lower forage utilization to moderate levels in riparian areas and improve rangeland condition. Proposed rangeland developments would improve livestock distribution and reduce the grazing pressure in riparian areas. The cumulative impacts of rangeland developments, minimum rest requirements, moderate utilization, and fenced exclosures would improve the vigor and increase reproduction of herbaceous vegetation and reduce impacts to woody plant species.

Areas without grazing systems would be protected by developing habitat management plans (HMPs) that would incorporate rest during critical growing seasons, limit utilization to an average of 40 percent on key forage species and 20 percent on cottonwoods and willows, and implement special management needed to improve the condition of the riparian habitat. AMPs or HMPs would be developed to identify the specific actions for riparian protection on allotments with important riparian areas (Table 3-8).

Plant cover and key species composition in riparian areas would increase slightly as rangeland condition improves as follows: excellent from 840 to 2,300 acres, good from 5,070 to 4,850 acres, fair from 3,940 to 3,380 acres and poor from 1,230 to 540 acres.

Protected Plants

The *Proposed Action's* vegetation allocation and minimum rest requirement would benefit protected plants by lowering utilization, improving plant vigor, and increasing reproduction on intensive allotments. Three protected plant species in the EIS area are affected by grazing. The remaining five protected or sensitive plants are not preferred browse for which the effects of grazing would be limiting factors (Butterwick, 1981). See Table 3-3.

Mammillaria viridiflora is found in the chaparral vegetation type of the Harquahala Mountains. Though not directly grazed by livestock, it needs perennial grasses for protection and moisture. Under the *Proposed Action,* it would improve through the implementation of the protective measures discussed in Chapter 2, including a fenced exclosure in the Harquahala Mountains. Intensive grazing management on the Aguila allotment would ensure the protection of this plant.

Juncus articulatus and *Thelypteris puberula* var. *sonorensis* are riparian species occurring in Grapevine Springs and South Peoples Spring respectively. *J. articulatus* would be protected through the proposed AMP on the Santa Maria allotment. *T. puberula,* which occurs on the Van Keuren allotment, would be protected through a habitat management plan. BLM has proposed these two spring sites as areas of critical environmental concern (ACECs) and would incorporate specific measures for protection into ACEC management plans.

SOILS

Erosion and Productivity

In the long term, improved grazing management and moderate utilization on 10 intensively managed allotments would increase effective ground cover, thus decreasing erosion and improving soil productivity. These projections reflect professional judgment based on the rangeland inventory and the impacts projected for vegetation. In riparian areas, soils in a moderate or severe erosion condition would improve, since livestock and burro use would be curtailed.

Soil erosion on 16 less intensively managed and 42 nonintensively managed allotments would slightly decrease or show no measurable change. Table 4-4 shows projected long-term impacts to soils by grazing management level.

Soil Compaction

The changes in compaction of clayey soils under different types of grazing management are summarized in Table 4-4. Soil compaction would increase at most new spring developments and well sites. These areas, however, are small, and overall impacts should be slight.

Building rangeland developments under the *Proposed Action* would temporarily disturb 37 acres of soil and permanently occupy 9 acres. The plants and soils disturbed

TABLE 4-4
IMPACTS ON SOILS

Grazing Management	Number of Allotments	Present[2] Apparent Range Trend	Acres	Changes In[1] Ground Cover and Litter	Organic Matter and Fertility	Soil Compaction	Water Infiltration	Erosion (Water & Wind) Soil Loss[3]
PROPOSED ACTION								
Intensive	3	Up	84,900	Increase	Increase	Decrease	Increase	Decrease
	7	Static	353,600	Increase	Increase	Decrease	Increase	Decrease
Less Intensive	7	Up	88,800	Slight Increase	Slight Increase	Slight Decrease	Slight Increase	Slight Decrease
	9	Static	309,800	Negligible	Negligible	Negligible	Negligible	Negligible
Nonintensive	11	Up	54,050	Increase	Increase	Decrease	Increase	Decrease
	31	Static	418,270	Negligible	Negligible	Negligible	Negligible	Negligible
	10	Down	65,380	Negligible	Neglibible	Negligible	Negligible	Negligible
Wildlife (Reserved)	1	NA	18,200	NA	NA	NA	NA	NA
NO ACTION								
Yearlong	10	Up	178,010	Slight Increase	Slight Increase	Slight Decrease	Slight Increase	Slight Decrease
	22	Static	840,840	Negligible	Negligible	Negligible	Negligible	Negligible
	3	Down	45,450	Slight Decrease	Decrease	Increase	Decrease	Increase
Intensive	1	Up	31,000	Slight Increase	Slight Increase	Slight Decrease	Slight Increase	Slight Decrease
Custodial	10	Up	18,930	Slight Increase	Slight Increase	Slight Decrease	Slight Increase	Slight Decrease
	18	Static	69,740	Negligible	Negligible	Negligible	Negligible	Negligible
	7	Down	19,730	Slight Decrease	Decrease	Increase	Decrease	Increase
Ephemeral	7	Static	171,100	Negligible	Negligible	Negligible	Negligible	Negligible
Wildlife (Reserved)	1	NA	18,200	NA	NA	NA	NA	NA
INTENSIVE GRAZING								
Intensive	11	Up	208,960	Increase	Increase	Decrease	Increase	Decrease
	22	Static	840,860	Increase	Increase	Decrease	Increase	Decrease
	3	Down	45,480	Increase	Increase	Decrease	Increase	Decrease
Nonintensive	10	Up	18,930	Slight Increase	Slight Increase	Slight Decrease	Slight Increase	Slight Decrease
	25	Static	240,850	Negligible	Negligible	Negligible	Negligible	Negligible
	7	Down	19,720	Negligible	Negligible	Negligible	Negligible	Negligible
Wildlife (Reserved)	1	NA	18,200	NA	NA	NA	NA	NA
SEASONAL GRAZING[4]								
Seasonal	10	Up	178,010	Slight Increase	Increase	Decrease	Increase	Decrease
	22	Static	840,840	Negligible	Negligible	Negligible	Negligible	Negligible
	3	Down	45,450	Negligible	Negligible	Negligible	Negligible	Negligible
Intensive	1	Up	31,000	Increase	Increase	Decrease	Increase	Decrease
Nonintensive	10	Up	18,930	Increase	Increase	Decrease	Increase	Decrease
	25	Static	240,850	Negligible	Negligible	Negligible	Negligible	Negligible
	7	Down	19,720	Negligible	Negligible	Negligible	Negligible	Negligible
Wildlife (Reserved)	1	NA	18,200	NA	NA	NA	NA	NA
NO LIVESTOCK								
No Livestock	All Public Land	—	1,393,000	Increase	Increase	Decrease	Increase	Decrease

[1] Projections are based on Walnut Gulch Experiment Station Watershed Studies in southeastern Arizona (Arizona Inter-Agency Range Committee, 1972), and present range trend and condition.
[2] Present apparent range trend and condition based on our 1978-80 rangeland inventory. See Appendix 3.
[3] These interpretations were based on existing soil survey data and professional judgment.
[4] Estimates for this alternative apply to the Ephemeral Option as well.
NA = Not Available.

would need an estimated 3 to 10 years to recover because of the area's low rainfall (BLM, 1978). During the construction and recovery period, soil compaction and the removal of ground cover would temporarily increase erosion. But as vegetation and litter increase, soil erosion rates should decline and become insignificant (Table 4-5).

TABLE 4-5
ACRES DISTURBED BY RANGELAND DEVELOPMENTS

Alternative	Acres Disturbed	
	Temporary	Permanent
Proposed Action	37	9
No Action	0	0
Intensive Grazing	115	43
Seasonal Grazing	34	10
No Livestock	891	191

Sediment Yield

Under the *Proposed Action,* sediment yield on intensively managed allotments would slightly decline due to increased ground cover, less erosion, and reduced grazing pressure. Although BLM lacks the data to quantify this reduction, sediment yields on soil associations producing moderate amounts of sediment could decrease to slight after 20 years. Negligible or slight sediment-yielding areas would not significantly change.

WATER RESOURCES

Water Quantity

Assuming that long-term forage increases of 6,600 AUMs under the *Proposed Action* would lead to increased grazing, annual consumption of water by grazing animals could increase from 63 to 68 acre-feet. New water developments on nine intensively managed allotments, however, would not significantly increase water in storage from the present 130 acre-feet.

Decreased surface water yields from intensively managed allotments are expected because of increased infiltration and greater soil moisture deficits caused by increased vegetation (Cable, 1980). Overall impacts to surface water yields for the EIS area, however, are expected to be negligible because water yields from less intensive and nonintensive allotments would show little change, depending on current vegetation trends and future adjustments in grazing.

Water Quality

Except on intensively managed allotments where water quality may slightly improve, overall surface water quality would be unaffected. High sediment and coliform rates would follow extreme runoff events, as most runoff from public lands is the result of high-intensity summer thundershowers or long-duration winter storms.

Placing new water developments away from riparian habitats and reducing wild burro numbers would reduce grazing pressure along streambanks and spring sites. Water quality would thus slightly improve from decreased bank erosion and less direct defecation into streams. Periodic rest on intensive allotments and fenced exclosures would also improve water quality in riparian areas. The *Proposed Action* would not measurably affect ground water.

LIVESTOCK GRAZING

Adjustments in Livestock Numbers

The *Proposed Action* would initially reduce allowable livestock numbers on public lands by 16 percent from authorized grazing preference but increase allowable livestock numbers 7 percent over the past 5-year (1976-1980) average licensed use.

Licensed use on small ranches would be reduced by an average of 11 percent from authorized grazing preference. All small ranches except Orosco would be adjusted to the past 5-year average licensed use. Orosco has been understocked during the past 5 years, and BLM determined it should keep its authorized grazing preference until monitoring reveals a need for adjustment. Twenty years after implementation, increases in forage production could allow stocking levels on these ranches to increase to an average of 15 percent above their 5-year average licensed use or 4 percent below their authorized grazing preferences.

Initial adjustments would reduce livestock numbers on medium-size ranches by an average of 10 percent from the authorized grazing preference. Leidig and Loma Linda allotments have been understocked during the past 5 years, and BLM determined they should stay at authorized grazing preference. All other allotments would be adjusted to 5-year average licensed use. Twenty years after implementation, increases in forage production could allow stocking levels on medium-size ranches to increase to their present authorized grazing preferences.

Large ranches in the EIS area would undergo an average initial reduction of 24 percent from their authorized grazing preferences, and all allotments but Lamberson would be adjusted to the past 5-year average licensed use. BLM determined Lamberson has been understocked and should retain its authorized grazing preference. Forage increases over a 20-year period could permit average stocking levels on large ranches to increase to within 16 percent of their authorized grazing preferences.

Table 3-5 groups allotments by ranch size. Appendix 4 shows initial and projected allocations by allotment.

Ranching Operations

The *Proposed Action* would place nine allotments, involving nine operators, under intensive grazing management. These allotments would generally shift from continuous or sporadic grazing to grazing systems with periodic rest and seasonal deferments. Intensive grazing management would require more labor to monitor herds, maintain pasture fences, and move livestock from pasture to pasture. Proposed water developments would improve livestock distribution within allotments. Better distribution and stocking at proper levels would also reduce grazing pressure in overgrazed areas. Over time, the production of key forage species would increase, and vigor would improve, increasing the quantity and improving the quality of livestock forage.

Implementing intensive management would require rangeland developments whose construction would increase operator workloads and expenses. These additional costs would be a relatively short-term impact, but increased maintenance costs would be permanent. The Pipeline allotment is now under an intensive grazing system and would undergo no change in its operation.

Sixteen allotments involving 14 ranches would be less intensively managed, and 53 allotments would be nonintensively managed, including 7 allotments that would continue under ephemeral grazing. Management of these allotments would not change in the short term.

Livestock Performance

Intensively managed grazing would require livestock to change grazing habits. Livestock would have to adapt to new terrain, water sources, increased concentrations, and more frequent handling and movement. At first, the stress of this change could cause weight loss. But as livestock adapt to the new systems, their performance would improve. Over time, grazing systems would improve rangeland conditions. The more desirable forage species for livestock would increase, improving weight gains and calf crops and reducing death loss (Table 4-6).

TABLE 4-6
IMPACTS ON LIVESTOCK PERFORMANCE BY RANCH SIZE

	Existing Situation	Proposed Action	No Action	Intensive Grazing
Small Ranch (0-99 head)				
Calf Crop (percent)	79	83	79	83
Steer Calf Weaning Wt. (lbs.)	420	468	420	468
Heifer Calf Weaning Wt. (lbs.)	365	413	365	413
Cull Cow (percent)	17	16	17	16
Medium-Size Ranch (100-199 head)				
Calf Crop (percent)	76	83	76	83
Steer Calf Weaning Wt. (lbs.)	420	468	420	468
Heifer Calf Weaning Wt. (lbs.)	365	413	365	413
Cull Cow (percent)	16	15	16	15
Large Ranch (>200 head)				
Calf Crop (percent)	70	83	70	83
Steer Calf Weaning Wt. (lbs.)	380	428	380	428
Heifer Calf Weaning Wt. (lbs.)	360	408	360	408
Cull Cow (percent)	15	14	15	14

* Seasonal grazing and elimination of livestock grazing alternatives are not listed because the ranches would not exhibit the production factors used.

Fencing pastures and allotment boundaries would permit greater control over livestock and help in detecting livestock trespass. Grazing systems would further benefit livestock production by requiring operators to more regularly handle, move, and work their livestock. Ranchers would be in a better position to care for their animals and to monitor animal health, quality, and breeding.

The *Proposed Action* would not change livestock performance on less intensive and ephemeral allotments or on nonintensive allotments with stable trends in rangeland condition. In the long term, livestock performance would drop on nonintensive allotments with downward trends, unless monitoring and mitigation lead to actions that stabilize or reverse the trends. BLM proposes to intensively monitor these allotments to determine what changes are needed in livestock numbers or management to restore satisfactory conditions and improve livestock performance.

WILDLIFE

This section analyzes the impacts of the *Proposed Action* on wildlife habitat components — food, water, cover, and space. The effects of grazing on wildlife habitat are complex, involving many interrelationships that are not clearly understood. Impacts are thus discussed by wildlife groups, except where data exist for individual species. Table 4-7 rates the impacts of the *Proposed Action* on wildlife and its habitat. The analysis addresses specific impacts to wildlife and habitat on public lands only.

Introduction

Most significant impacts would not occur in the short term. Rather they would be evident in the very long term (beyond 20 years), since habitat changes are related to changes in vegetation (see Figure 2-1). Significant changes

TABLE 4-7
WILDLIFE AND HABITAT IMPACT RATINGS UNDER THE PROPOSED ACTION*

Alternative's Features	Big Game				Special Status Species				
	Mule Deer	Bighorn Sheep	Pronghorn Antelope	Javelina	Federal-Listed Threatened/ Endangered Species	Other Protected Species**	Upland and Small Game	Nongame Wildlife	Riparian Habitats
Grazing Use									
Vegetation Production Available Initially	2	4	2	4	2	2	3	2	1
Vegetation Production Available in 5 Years	2	4	2	4	2	2	3	2	3
Vegetation Production Available in 20 Years	4	4	3	4	3	3	4	3	4
Levels of Grazing Management									
Intensive	4	4	4	3	4	3	3	3	4
Less Intensive	4	NA	NA	3	4	4	4	4	4
Nonintensive	3	NA	NA	3	2	2	3	2	3
Management Facilities									
Water Developments	4	4	3	4	NA	4	4	4	NA
Fencing	3	2	2	3	NA	NA	NA	NA	NA
Average	3.2	3.7	2.7	3.5	2.8	2.9	3.4	2.9	3.2
	Average Rating for Alternative: 3.1				Average Rating for Existing Situation: 2.5				

* Rating system: 1 = most significant adverse impact; 2 = adverse impact; 3 = minor or no impact; 4 = beneficial impact; 5 = most significant beneficial impact; NA = not applicable.
** Proposed threatened or endangered species, state-listed species, BLM sensitive species.

would occur on 26 allotments over 837,100 acres of public land, but 555,900 acres would remain relatively unchanged.

Intensive management on 10 allotments would provide rest from livestock grazing and ensure moderate utilization to eventually improve rangeland condition and increase forage production. Significant habitat improvement, however, cannot be predicted for rest treatments on intensively managed allotments because different systems have different effects (BLM, 1979c). Impacts can be projected with certainty only after allotment management plans with specific treatments and systems are developed. Rested pastures, however, would temporarily provide increased forage and cover for wildlife. Grazing systems on the Pipeline allotment have led to numerous improvements in small-game and nongame habitats, and new waters and increased browse production have benefited big game.

Less intensive management on 16 allotments would provide for year-long grazing and no rest treatments and would negligibly impact wildlife. Rangeland condition would slightly improve. Small increases in litter, cover, and plant vigor would slightly benefit nongame, and improved plant vigor would increase forage. Improvements would result from current upward trends in condition and from moderate utilization of forage.

Nonintensive grazing on 45 allotments would allow yearlong grazing and require no rest treatments. Wildlife habitat would continue to improve or decline along present trends, depending on grazing management practices. No significant improvements in habitat would occur in these areas unless, as a result of monitoring or mitigation, livestock operators reduce grazing pressure or improve grazing management.

Ephemeral grazing management on seven allotments would benefit perennial vegetation, since in most years the land would be rested from livestock use from June through January. Cattle would not significantly conflict with desert tortoises, since most crucial desert tortoise habitat lies outside the ephemeral allotments. Potential conflicts near the Buckskin Mountains could be partially mitigated by measures for resource protection described in Chapter 2. Wildlife would otherwise be impacted the same as by rest treatments under intensive management, except benefits would be greater due to more frequent rest.

Ephemeral grazing on perennial-ephemeral allotments could conflict with some nongame requirements in habitats

below 3,500 feet elevation by increasing wildlife-livestock competition for productive annual blooms that provide energy for wildlife reproduction.

The *Proposed Action* calls for several rangeland developments, which would permanently remove 9 acres of habitat from production. Two types of facilities are proposed: water developments and fences. Twelve water developments are proposed for intensively managed allotments (Table 2-6); all would provide year-round water. Heavy forage utilization, trampling, and trailing in an average 750-foot radius from the new waters would greatly deteriorate vegetation on 500 acres, forming disturbed areas.

Increased water availability would benefit several species, as water is a primary limiting factor to habitat quality in much of the desert covering 70 percent of the planning area. The increase in water, however, would also increase competition for some species.

Fencing would extend through seven allotments for 41 miles, permanently disturbing 4 acres of habitat but only negligibly impacting wildlife other than big game.

Big Game

Mule Deer

The vegetation production on mule deer habitat would increase forage carrying capacity by 19 percent. The following allotments would improve most: Aguila, Babcock, Carco, Coughlin, Loma Linda, Orosco, Santa Maria, Sky Arrow, and Wickenburg. Competition for forage and space would decline in the long term, since nearly 260,000 acres of deer habitat would improve to good and excellent rangeland condition.

Mule deer habitat would be rested in a patchwork pattern over 438,500 acres on 10 allotments, providing plenty of forage for deer in at least one pasture per allotment. Mule deer might not fully use all the rested pastures, since they are creatures of habit and seem reluctant to move into new areas.

More waters in mule deer habitat would benefit deer by expanding their ability to forage in new areas. On the other hand, 12 water developments would significantly extend the range of livestock into areas that have previously been only lightly grazed. As a result, livestock and deer would increasingly compete for browse and space.

Although the 41 miles of new fences in deer habitat would be designed to reduce deer mortality, an unknown number of deer might still suffer from entanglement. Fences would also disrupt use patterns until deer learn to cross them.

Public Lands Provide Habitat for Big Game

The mule deer is one of the most conspicuous big-game animals in the EIS area and is sought after by outdoor recreationists and hunters. Some alternatives for grazing management would improve deer habitat by increasing food and water.

Pronghorn Antelope

Pronghorn habitat would not significantly change under the *Proposed Action.*

Desert Bighorn Sheep

The forage productivity of desert bighorn habitat would only slightly increase on three allotments in the long term. Competition from livestock and burros, however, would decrease to allow for a 39 percent long-term increase in bighorn forage carrying capacity. Over 46,000 acres would improve to good and excellent condition in the desert shrub type, allowing bighorn to use more of the Aguila, Hancock, and Leidig allotments. Increased forage would make the foothills more usable by bighorn. Thirty wild burros roaming in the Ekvall and Bar D 4 allotments, however, would compete with bighorns if the Arizona Game and Fish Department carries out plans to reintroduce bighorns in the Black Mountains.

Desert bighorn sheep would benefit from rested pastures less than other big game because of the bighorn's limited distribution. Like deer, bighorn are reluctant to move into new areas, and they may not take advantage of changing rested pastures. Desert bighorn sheep would benefit from additional waters and separating existing waters to segregate wildlife from livestock.

Javelina

The *Proposed Action* would benefit javelina. Javelina would continue to increase and become better distributed throughout the EIS area. Reduced forage competition would allow long-term increases in javelina numbers. In the short term javelina would benefit by using rested pastures. They would also benefit from the long-term increase in production expected under grazing treatments and increased water availability, which would increase the size of their foraging areas. Fencing would not greatly affect javelina habitat.

Waterfowl and Shorebirds

The *Proposed Action* would both benefit and harm waterfowl and shorebird habitat. Long-term increases in grass and forb cover (Table 4-2) would be partially offset by continued livestock disturbance in 50 percent of the riparian habitat and at water sources. This disturbance would reduce woody plant cover (Hughes, 1978), and waterfowl and shorebird habitat would slightly deteriorate. Waterfowl and shorebirds would not be significantly affected by grazing treatments, but each additional water development would directly benefit waterfowl and shorebirds by providing more stopover sites during migration and providing wintering or breeding sites at larger developments.

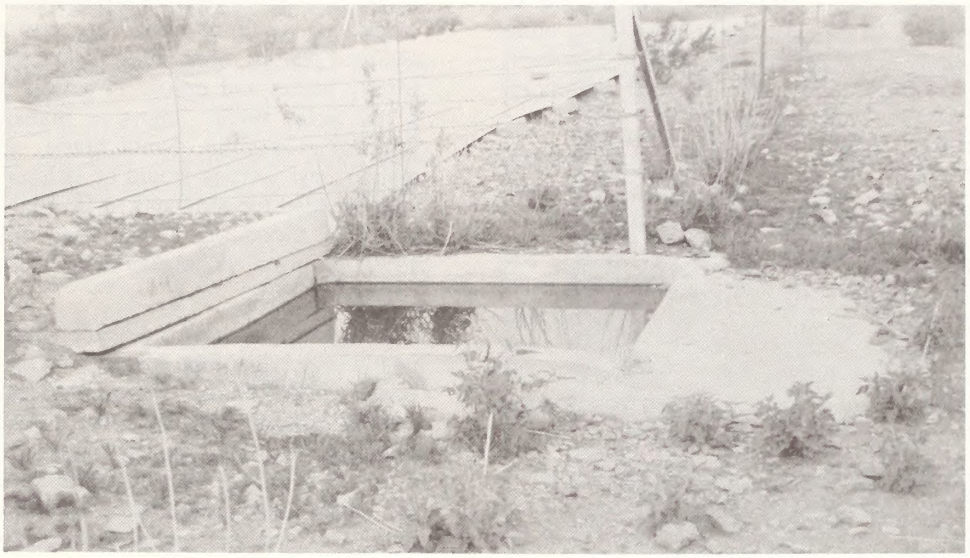
Upland and Small Game

The productivity of upland and small-game habitat would increase by 5 percent in the long term. Gambel's quail numbers would fluctuate less than at present, and during high rainfall years populations could be higher than at present.

Upland and small game would take advantage of periodically ungrazed habitat. Rest from grazing would somewhat alleviate competition for food and space in the short term and increase needed cover in the long term. Grazing treatments would not greatly affect white-winged doves, but protecting 3,200 of riparian acres (28 percent of the 11,100 acres) would improve white-winged dove habitat. Desert cottontail and jackrabbit numbers would probably not significantly change.

Upland and small game would benefit from new waters with surrounding exclosures, because the relationship of protected area, disturbed area, and surrounding habitat would create edges or ecotones (Leopold, 1933), which could be beneficial in addition to the water source (Dick-Peddie, 1976; Thomas, Maser, and Rodiek, 1978).

Tobosa



Catchments Will Improve Big-Game Habitats

BLM proposes to improve big-game habitat on public lands by building 20 catchments in cooperation with the Arizona Game and Fish Department. Catchments, like the one pictured above, provide relatively dependable sources of water needed by big-game animals to survive in desert environments.

Nongame Wildlife

Increased plant cover on 120,000 acres (9 percent of the EIS area) and decreased competition among perennial forage users would improve the condition of the lower layers of vegetation needed for cover by many nongame species. Habitat with improved overall ground cover would increase by nearly 60 percent, but 676,000 acres in the EIS area would still lack sufficient ground cover.

Nongame would temporarily benefit in each pasture during rest periods, when cover would be more abundant and nest-trampling and forage competition would be reduced. These benefits would occur on 10 of the 79 allotments.

Approximately 30 nongame species would benefit directly from new livestock waters (Elder, 1953; Wright, 1959). Nongame habitat in the 500 disturbed acres around new waters would be severely impacted by reduced plant cover and increased soil compaction (Busack and Bury, 1974).

Protected and Sensitive Wildlife

Aquatic and riparian bald eagle winter habitat would remain in a deteriorated condition in the short term but improve in the very long term (beyond 20 years). Eagles would find fewer roost trees in the short term as decadent trees die out without replacement. More potential roost trees, however, would eventually develop. Aquatic habitat would not significantly change due to changes in livestock grazing alone. At least 3,200 acres or half of the riparian bald eagle habitat would improve in the very long term.

Potential peregrine falcon habitat would react as would bald eagle habitat, and its likelihood of supporting peregrine use would be greater in the long term.

In the long term, 68,800 acres of tortoise habitat would improve on 15 allotments, whereas habitat quality on 41,000 acres would remain static or decline. In the short term, tortoises and other forage users would compete less for winter-spring annuals on 68,800 acres. In the long term, perennial herbaceous forage would increase, and competition for forage would decrease. On the remaining 41,000 acres, livestock grazing on ephemeral growth could decrease forage during winter and spring seasons as many as 8 years out of 10. Such grazing would create an artificial drought, causing tortoises to lose weight and their reproduction to decline (Berry, 1978). Since production of ephemeral forage is not dependable, further human manipulation could disrupt wildlife dependent on such forage. Water developments in desert tortoise habitat would concentrate livestock and increase forage competition and deaths due to trampling.

In the very long term, black hawk nesting habitat would improve over at least 1,100 acres as the number of nesting trees increases. In the short term, black hawk numbers would not greatly change. Nesting habitat, however, would slightly decline as dead trees are not immediately replaced.

Zone-tailed hawk habitat would remain little changed in the long term, though zone-tails would indirectly benefit from rest periods through small increases in prey base.

During migrations, great egrets, snowy egrets, and black-crowned night herons would continue to stopover at denuded areas around stock tanks, Alamo Lake, and sections of the Bill Williams, Santa Maria, Hassayampa, and Big Sandy Rivers. They would probably not breed in the EIS area because cover would be lacking. They would not directly benefit from proposed grazing treatments.

Gilbert's skink habitat would improve in the long term, primarily due to a 4 percent increase in plant cover. Rest periods would help increase ground cover and possibly increase prey.

The quality of Gila monster habitat would improve, primarily due to increases in prey base. Prey would increase as a result of periodic rest from grazing and an increase in plant cover in preferred habitat.

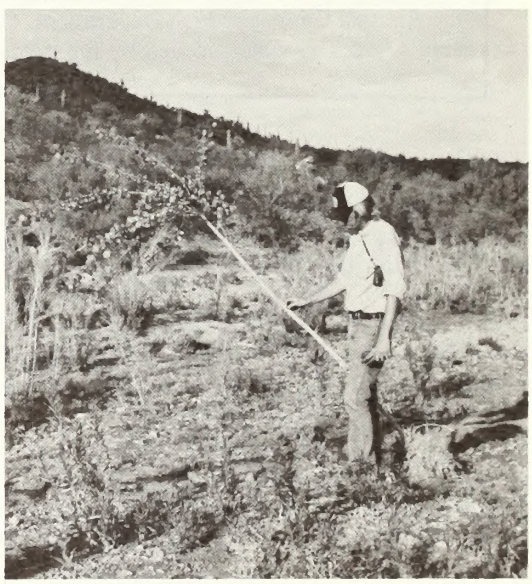
Sonoran mountain kingsnake habitat would not improve, since plant cover and prey levels would remain unchanged on 2,100 acres of nonintensively managed habitat.

Improvement in the habitat of other protected or sensitive birds of prey would vary. Ferruginous hawk habitat would remain unchanged on the nonintensively managed 2,600 acres of grassland habitat. Sharp-shinned and Cooper's hawk habitat in riparian areas would improve on 2,250 acres. The remaining 31,100 acres of nonintensively managed habitat would remain little changed in the long term. Periods of rest from livestock grazing during the nesting season would slightly improve nesting success (Millsap, 1981). Finally, prairie falcon foraging habitat would slightly decline as 249,000 acres of habitat improve to fair and good rangeland condition in creosotebush and paloverde habitat.

Riparian Habitat

In the short term, riparian habitat quality would continue to gradually decline along present trends. In the long term, however, intensive grazing management and resource-enhancing measures would lead to reproduction of broadleaf trees that would replace older decadent trees on 1,100 acres or half of the broadleaf riparian habitat. On the remaining 50 percent of broadleaf habitat not proposed for intensive management (1,000 acres), young cottonwoods, willows, and ashes would not become established to replace old trees without effective controls on grazing animals (BLM, 1979c; Hughes 1978). Habitat quality in these areas would decline through the long term unless a habitat management plan or other measures are implemented to protect woody plants and ensure broadleaf reproduction. On the 1,100 acres under intensive management (portions of Babcock, Coughlin, Santa Maria, and Sky Arrow allotments), rest periods would be tailored to allow the several years needed for seedlings of favored woody plants — cottonwood, Goodding willow, and velvet ash — (Martin, 1979) to grow to heights beyond the reach of livestock (BLM, 1979c).

Impacts of water developments on riparian habitat would depend on the location of the waters. Developing waters within 2 miles of riparian habitat would not improve riparian quality, since such waters would not effectively attract livestock from riparian corridors. Conversely, waters more than 3 miles from riparian areas would attract livestock into other foraging lands and cause a long-term slackening of cattle grazing in the riparian corridor. No data, however, exist on the extent of the problem and the amount



Young Broadleaf Seedlings Vulnerable to Grazing

Broadleaf tree seedlings are favored forage for livestock and other animals in riparian zones. The young cottonwood pictured above has been stripped of leaves, twigs, and branches except at its crown. Destruction of seedlings by grazing prevents broadleaf tree replacement and leads to declines in riparian habitat quality.

of improvement attainable. Improved water distribution alone would not greatly improve the quality of riparian habitat.

The 9,000 acres of mesquite washes making up the rest of the riparian habitat would not significantly change in the long term. Under habitat management plans calling for tree plantings, exclosures, and other measures, all 2,100 acres of broadleaf riparian habitat would improve to an unknown extent in the long term.

WILD BURROS

The *Proposed Action* would eliminate wild burros from three use areas (12 allotments) and reduce the Alamo herd from 300 to 200. Vegetation and crucial wildlife habitat in the burro use areas would benefit from the reduced competition for 2,400 AUMs of forage and 2.2 acre-feet of water currently used by burros. In addition, removing burros from the Little Harquahala Mountains would alleviate management problems of trespass burros in the farmland and subdivisions around Salome. A well-managed herd in the Alamo Herd Management Area (HMA) along with interpretive signing would provide opportunities for public viewing and enjoyment.

The *Proposed Action* would lead to the following adverse impacts.

• The removal program would cause temporary stress in the animals removed or disturbed in the chase, including wildlife and livestock.

• Eliminating burros from the Harquahala-Big Horn Mountains would remove a genepool source of red burros and white burros, which are rare in Arizona. From 10 to 15 red or white burros are believed to exist in this unit.

• Protecting the riparian habitat along the Bill Williams and Santa Maria Rivers for wildlife habitat through fencing and other management actions could inhibit burro access to stretches of water and the river bottom forage — bermuda grass, mesquite leaves, and mesquite beans. In the worst-case situation, new fencing along the river and on the Santa Maria allotment could locally reduce the free-roaming behavior of burros and restrict the genepool by fragmenting the herd. Field observations indicate, however, that livestock fences do not greatly impede burro movement (Durfee, 1981).

• As many as 30 burros would remain in the Bar D 4 and Ekvall allotments at the east end of the Alamo HMA and would adversely impact protected plant areas, raptor areas, and proposals for bighorn reintroductions. Wild burros intermittently using solidly blocked nonfederal lands in these allotments would continue to cause problems for the state and private land owners.

• Continued burro use of the area around Alamo Lake administered by the Corps of Engineers would interfere with land and resource management by the Corps, the Arizona Game and Fish Department (AG&FD), and the Arizona State Parks Department. Burro requirements for forage and water from the area conflict with AG&FD plans to fence the lake and create waterfowl habitat by planting small-grain crops in the river bottoms and at the headwaters of the lake.

• Creating and managing the Alamo HMA with a herd of 200 burros would affect eight grazing allotments and require the annual commitment of 1,200 AUMs of forage and 1.1 acre-feet of water. Further costs would accrue from the monitoring and management of the herd and from the removal of 75 animals every 3 years to maintain the population level.

Uncontrolled Wild Burro Populations Can Damage Vegetation

Rapidly expanding wild burro populations compete with wildlife and livestock for food. When preferred forage plants are eaten up, the burros turn to less palatable trees and shrubs, eating the tender layers under the bark of the branches. Not only do burros eat the current year's growth, but they destroy years of production and kill or stunt plants. A paloverde tree pictured above has been severely impacted by burro use near Alamo Lake.

CULTURAL RESOURCES

Since significant direct impacts on cultural resources will be avoided or mitigated, this analysis deals with inadvertent or indirect impacts only. The source and significance of impacts on cultural resources from present grazing management are shown in Table 4-8. Under the existing situation most agents of site deterioration are tied to rangeland developments.

Rangeland developments may affect cultural resources in the following ways: (1) loss of the spatial relationships between cultural materials and their surroundings; (2) loss of entire site elements, such as artifacts, features, or portions of site areas; (3) loss of historical context, especially information on occupation dates and prehistoric environment; and (4) reduction in the cultural resource base after salvage. The nature and degree of these impacts from grazing management have not been adequately monitored and documented. A limited study by Roney (1977), however, found that cattle trampling significantly damages lithic sites and artifacts.

The significance of these impacts on cultural resources varies according to the location and condition of the site. Buried deposits, undetectable by intensive surface survey (Class III), could be affected by construction. Concentrated trampling of livestock would have the greatest effect on surface sites, which include most of the sites in the EIS area. This source of deterioration is especially significant for habitation and camp sites near waters. Most rockshelters, rock art, and rock alignments, however, would hardly be affected. All site types are vulnerable to vandalism and looting, but structures, rockshelters, and rock art are more common targets. The degree and extent of this impact depends on the accessibility and use of an area. Although site erosion occurs on most sites, surface artifact scatters, especially those in unstable soils, probably would suffer more than other types. Livestock grazing directly affects certain cultural resources. For example, surface features and structures can be destroyed by trampling and rubbing.

The impacts of grazing management on cultural resources would vary by allotment, since allotments contain different amounts of sensitive areas. The acreage of sensitive areas per allotment was calculated, and an index of sensitivity (i.e. percent of sensitive area per allotment) was computed as shown in Appendix 12. Allotments were then ranked by the total acres of sensitive areas (raw rank) and by the sensitivity index (adjusted rank). Table 4-9 shows the resulting sensitivity ratings by allotment.

TABLE 4-8
EXISTING AND FUTURE IMPACTS ON CULTURAL RESOURCES[1]

Component	Agent of Deterioration	Existing[2] Situation	Proposed Action	No Action	Intensive Grazing	Seasonal Grazing[3]	No Livestock
Rangeland Developments	Construction - undiscovered CR	Low	>>	>	>>>	>	>
	Concentrated Trampling	Moderate	>>	>	>>>	>>	<<<
	Vandalism - from increased access	High	>	>	>>	>	<<
	Site Erosion	Low	<	>	>	<	<<<
Stocking Levels	Livestock Grazing	Low	<	>	<	<	<<<
Grazing System	None	—	—	—	—	—	--

1 Impacts compared to existing situation.
> = low increase
>> = moderate increase
>>> = high increase
< = low decrease
<< = moderate decrease
<<< = high decrease
— = no change

2 All impacts under the existing situation are considered adverse and long-term, since cultural resources are nonrenewable and lost information is irretrievable.

3 Estimates for this alternative apply to the ephemeral option as well.

TABLE 4-9
CULTURAL RESOURCE SENSITIVITY RATING BY ALLOTMENT

Allotment	Sensitivity Rating		Allotment	Sensitivity Rating	
	Adjusted*	Raw**		Adjusted*	Raw**
Aguila	High	High	James, H.	—	—
Alamo	Low	Moderate	Jenner	High	Moderate
Auza	—	—	Jones	—	—
Babcock	—	—	KMJ	High	Low
Bar D 4	High	High	Lamberson	Low	Moderate
Bialac	Moderate	Moderate	Leidig	Moderate	High
Bodfish	—	—	Loma Linda	Moderate	High
Brown, Buck	High	Moderate	Los Caballeros	—	—
Cactus Garden	Low	Low	Medd	Moderate	Low
Cain	High	Low	Moralez	High	Moderate
Calhoun	Moderate	Moderate	Narramore	Moderate	Moderate
Carco	Low	Moderate	Ohaco	High	High
Carter	—	—	Orosco	Low	Low
Carter Herrera	Moderate	High	Palmerita	Low	Low
Central AZ	—	—	Park, H.	High	Low
Coughlin "A"	High	High	Park, R.	High	Low
Coughlin "B"	—	—	Park, R. & E.	High	Low
Cross Mountain	—	—	Peters	—	—
Date Creek	High	Low	Pipeline	Low	Moderate
Desert Hills "A"	—	—	Primrose	Low	Moderate
Desert Hills "B"	—	—	Rees	Low	Moderate
Douglas	High	High	Ridgeway Kong	Low	Low
Eagle Eye	—	—	R. Santa Ynez	High	Moderate
Eagle Eye 6Y	Moderate	Low	Saddle Mountain	High	High
Echeverria	High	High	Salome Community	High	Moderate
Effus	Low	Low	Santa Maria	—	—
Ekvall	—	—	Satathite	—	—
Flat Iron	Moderate	Moderate	Sitgreaves Red Hill	Low	Moderate
Foraker	High	Low	Sky Arrow	High	High
Garcia	—	—	Sprouse	High	High
Globe	—	—	Thompson	—	—
Gordon, R.	High	Low	Turner	High	High
Grantham	—	—	Van Keuren	High	Moderate
Hancock	Low	Moderate	Vasilius	—	—
Harcuvar	Moderate	High	Wellik	—	—
Hassayampa	Moderate	High	Whitehead	—	—
Hawkins	High	Low	White Tanks	High	High
Heine	—	—	Wickenburg "A"	Low	Low
Hogue Produce	Moderate	Low	Wickenburg "B"	—	—
			Wilson	High	Moderate

* Adjusted Sensitivity Rating:
High = Rank of 1-12
Moderate = Rank of 13-24
Low = Rank of 25-37

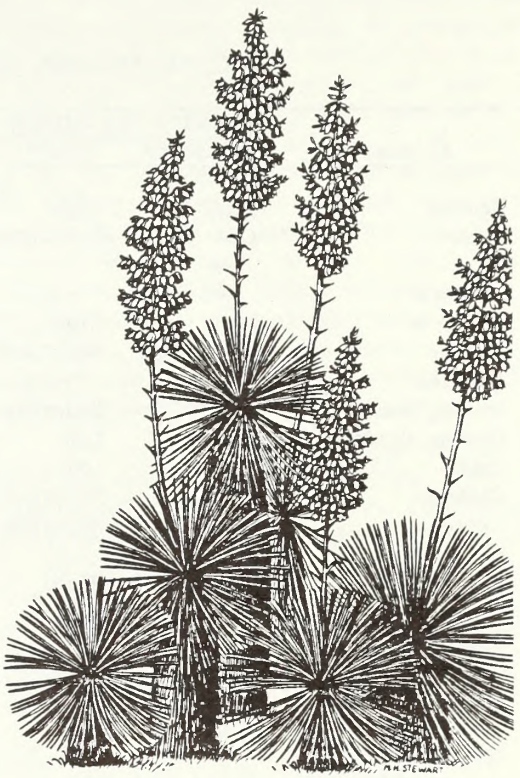
** Raw Sensitivity Rating:
High = Rank of 1-14
Moderate = Rank of 15-28
Low = Rank of 29-41

The impacts of grazing management on cultural resources are summarized in Table 4-8. The impacts of the *Proposed Action* and alternatives are compared to the existing situation and are rated as high, moderate, or low increases or decreases. Because cultural resources are nonrenewable and the loss of information resulting from these impacts is irreversible, all impacts are considered adverse and long term.

In general, the *Proposed Action* would moderately increase impacts to cultural resources in the EIS area. The *Proposed Action* calls for building new rangeland developments, which could destroy undiscovered sites. Vandalism would also increase due to more use of and access to rangeland facilities. Since initial stocking rates would be determined by average licensed use from 1976 to 1980 — a 16 percent reduction from the authorized grazing preference — impacts from livestock grazing could slightly decrease in the short term.

RECREATION

The *Proposed Action* would measurably impact hunting and negligibly impact off-road vehicle use and sightseeing. Big-game (deer and javelina only) populations could increase by 860 animals, increasing by 550 the estimated annual big-game hunting visitor days. The increase or decrease in visitor days due to population changes in small and upland game cannot be estimated with accuracy. Increases in game would slightly increase opportunities for viewing wildlife. See Tables 4-10 and 4-11.



Soaptree Yucca

TABLE 4-10
PROJECTED BIG-GAME NUMBERS ON PUBLIC LANDS[1,2]

Species	Present	Proposed Action	No Action	Intensive Grazing	Seasonal Grazing[3]	No Livestock
Mule Deer	2,800 (3,500)	3,230 (3,930)	2,600 (3,250)	3,490 (4,190)	3,330 (4,000)	4,440 (5,550)
Pronghorn	0 (100)	0 (100)	0 (100)	0 (100)	0 (100)	5 (105)
Desert Bighorn	100 (100)	140 (140)	100 (100)	180 (180)	180 (180)	250 (250)
Javelina	560 (690)	990 (1,130)	740 (880)	1,040 (1,180)	990 (1,130)	1,040 (1,750)

[1] Projections are for 20 years after implementation and are based on forage made available to big game and on the assumption that no other factors would limit population growth.
[2] Estimates in parentheses are for all lands in the EIS area.
[3] Estimates for this alternative apply to the ephemeral option as well.

TABLE 4-11
PROJECTED BIG-GAME HUNTING VISITOR DAYS[1]

	Present Situation	Proposed Action	No Action	Intensive Grazing	Seasonal Grazing[2]	No Livestock
Big-Game Hunting[3]	3,500	4,050	3,350	4,300	4,100	5,800
Change from Present		(+16%)	(-4%)	(+23%)	(+17%)	(+66%)

1 Projected for 20 years after implementation of an alternative. These estimates will vary for several reasons not related to the rangeland management: gasoline availability, demand, regional population increases, Arizona Game and Fish Department regulations, climatic conditions, increased costs, and legal access to public lands.
2 Estimates for this alternative apply to the ephemeral option as well.
3 Estimated for deer and javelina only.

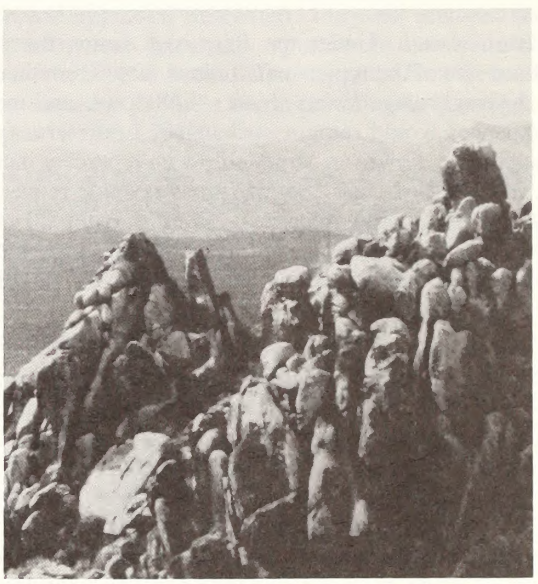
SOURCE: Wildlife Table 4-10; BLM, 1981a; AG&FD, 1980; 1981

VISUAL RESOURCES

Through increases in vegetation, the *Proposed Action* could change the color and texture of the landscape. This change would be gradual and most evident along roads. Short-term and highly localized visual contrasts would result from rangeland developments, but contrast ratings would be completed for all rangeland developments to ensure that recommended visual resource management class objectives are met. For criteria and methodology, see BLM Manual, Section 8400.

WILDERNESS VALUES

On lands in the EIS area established as wilderness study areas, all rangeland management activities will comply with BLM's *Interim Management Policy and Guidelines for Lands under Wilderness Review* (BLM, 1979b). No adverse impacts on wilderness values are expected.



Wilderness Studies Continue on Public Lands

Portions of the Harquahala Mountains pictured above form one of 13 wilderness study areas (WSAs) now being studied for wilderness suitability in the EIS area. Until the Congress determines which, if any, areas are to be designated wilderness, BLM will manage its rangeland program so as not to permanently impair wilderness values in the WSAs.

ECONOMIC AND SOCIAL CONDITIONS

Economic Conditions

This section describes the *Proposed Action's* economic impacts on EIS-area ranchers and the community, including impacts from expected changes in construction income and recreational use. Impacts to individual ranches cannot be quantified due to a lack of financial data for each ranch.

TABLE 4-12
RANCH ECONOMIC IMPACTS BY ALTERNATIVE

Impacts	Proposed Action		No Action		Intensive Grazing		Seasonal Grazing*		No Livestock	
	Short Term	Long Term	Short Term	Long Term	Short Term	Long Term	Short Term	Long Term	Short Term	Long Term
Net Revenue ($)										
Small-(0-99 head)	5,302	7,220	5,302	5,302	5,302	7,757	6,948	7,618	522	522
Medium (100-199 head)	12,093	19,937	12,093	12,093	12,093	20,174	18,502	19,756	2,239	2,239
Large (>200 head)	33,812	63,206	33,812	33,812	33,812	64,694	66,047	71,990	3,667	3,667
Ranch Values ($)										
Small (0-99 head)	76,500	84,000	85,500	85,500	76,500	85,500	76,500	85,500	12,000	12,000
Medium (100-199 head)	207,000	231,000	229,500	229,500	207,000	238,500	207,000	220,500	55,500	55,500
Large (>200 head)	739,000	813,000	1,020,000	1,020,000	739,500	831,000	739,500	807,000	124,500	124,500

* Estimates for this alternative apply to the allotments designated for seasonal grazing under the ephemeral option. But the ranch values for the eight allotments designated for ephemeral grazing are undetermined.

Rather, impacts to these operators are analyzed through the use of the three representative ranch income statements. Data from these income statements are then used to determine the impacts to the economy of the study area. Because this section analyzes entire ranch units, the analysis will consider federal and controlled AUMs.

Ranch Budgets

Small Ranch. Under the *Proposed Action* the short-term herd size of the typical small ranch would remain equal to its 5-year average licensed use — 48 cows, and income and expenses would remain unchanged. Long-term forage improvements, however, would allow an 8 percent increase to 52 cows. Yearly net revenue (gross revenue minus cash costs) initially would remain at $5,302. After 20 years, however, forage increases and improved calf crops and calf weights would increase yearly net revenue to $7,220 (Table 4-12).

To determine whether over a 20-year period the typical small rancher would be financially better off under continuation of present management or one of the alternatives, BLM economists calculated the present values of the expected yearly net revenues for each alternative. A discount rate of 7.125 percent was used in this analysis. The present value of 20 years of net revenue on the typical small ranch under present management amounts to $54,570, whereas the present value of such revenues under the *Proposed Action* amounts to $62,670 (Table 4-13).

TABLE 4-13
TOTAL NET RANCH REVENUE OVER A 20-YEAR PERIOD*

Ranch Size	Proposed Action	No Action	Intensive Grazing	Seasonal Grazing**	No Livestock
Small (0-99)	62,670	54,570	64,920	73,270	5,370
Medium (100-199)	157,600	124,460	158,610	195,400	23,040
Large (200-Over)	472,190	348,000	478,480	702,980	37,740

* Present value in 1980 dollars.
** Estimates for this alternative apply to the allotments designated for seasonal grazing under the ephemeral option. But the 20-year net revenue for the eight allotments designated for ephemeral grazing is undetermined.

Medium-Size Ranch. Under the *Proposed Action* the herd size of the typical medium-size ranch in the short term would remain at its 5-year average licensed use — 129 cows. The ranch's income and expenses would remain unchanged. Long-term forage improvements, however, would allow this ranch to stock 144 cows, a 12 percent increase over existing stocking. Yearly net revenue would initially remain at $12,093 but would gradually increase to $19,937 over 20 years, assuming an increase in forage, calf crops, and calf weights (Table 4-6). The present value of 20 years of net revenue on the medium-size ranch under present management amounts to $124,460, whereas such revenues under the *Proposed Action* amount to $157,600.

Large Ranch. Under the *Proposed Action* the herd size of the typical large ranch in the short term would remain equal to its 5-year average licensed use — 460 cows, and the ranch's income and expenses would remain unchanged. Long-term forage improvements, however, would allow the typical large ranch to stock 506 cows, a 10 percent increase over the existing level. Yearly net revenue would at first remain at $33,812, but long-term forage increases and improved calf crops and calf weights would increase yearly net revenue to $63,206 after 20 years. The present value of 20 years of net revenue on the large ranch under present grazing management amounts to $348,000, whereas such revenues under the *Proposed Action* amount to $472,190.

Ranch Finance

Ranch values are based on authorized grazing preference at an estimated $125 per AUM or $1,500 per animal unit (Durfee, 1981). The *Proposed Action* would suspend the preference above on allotment's 5-year average licensed use. Ranch values on the typical small ranch would decrease from $85,500 to $76,500 in the short term. Long-term AUM increases, however, would raise the value of the typical small ranch to $84,000. On the typical medium-size ranch, values would decrease from $229,000 to $207,000, but long-term AUM increases would raise the value back to

$231,000. The value of the typical large ranch would decrease from $1,020,000 to $739,000 in the short term. After 20 years, AUM increases are expected to raise the value of the typical large ranch to $813,000.

Changing financial conditions would probably little affect the rancher's borrowing ability. Some ranchers undergoing a large suspension in grazing preference might have problems attracting long-term capital. Operating profits, however, would remain unchanged in the short term as would the rancher's ability to borrow operating capital. Ranchers choosing to sell their ranches would be greatest affected, since the reduced value of ranches would cause the rancher to suffer an actual loss. Ranchers not selling their ranches for 20 years would be able to regain all or at least some of this lost value.

Regional Economics

Under the *Proposed Action,* annual gross receipts from the sale of livestock for the 33 EIS-area ranches would remain at $996,000 in the short term. The contribution of these ranches to the economic study area's livestock sales would remain at 0.32 percent. Gradual forage increases, however, would increase livestock sales to $1,407,000 or 0.50 percent of the study area's livestock-related sales (Table 4-14).

Ranch operating expenses for the 33 ranchers would remain at $497,000 in the short term and increase to $537,000 after 20 years. Net revenue would remain at $499,000, increasing to $870,000 after 20 years.

Ranch labor requirements would remain at 23 workyears, increasing to 25 workyears after 20 years. Annual earnings from this employment would at first amount to $242,000, increasing to $262,000 after 20 years.

Estimated annual construction earnings from new rangeland developments would amount to $28,000 for 5 years. Such earnings would represent less than 1 percent of the yearly construction-related earnings in the study area

Annual visitor use for big-game hunting in the planning area would increase by 550 visitor days after 20 years. Annual recreation-related expenditures would thus increase by $11,100, an insignificant amount when viewed on a regional level.

Benefit-Cost Analysis

A benefit-cost analysis by allotment was conducted for all allotments originally proposed for intensive grazing management. The analysis included such quantifiable benefits as livestock forage and production increases and big-game related recreation benefits. It did not include nonquantifiable benefits resulting from improved wildlife habitat and improved watershed. The costs included the initial development costs and replacement and maintenance costs over a 50-year period. The complete benefit-cost analysis is included in the Lower Gila North Planning Area Analysis (BLM, 1981b).

A ratio larger than 1:1 (e.g. 2:1, 3:1) signifies that benefits outweigh costs, whereas a ratio smaller than 1:1 (e.g. 1:2, 1:3) signifies that costs outweigh benefits. Nine allotments were found to have ratios larger than 1:1, and these

TABLE 4-14
REGIONAL ECONOMIC IMPACTS BY ALTERNATIVE

Regional Impacts	Proposed Action		No Action		Intensive Grazing		Seasonal Grazing[1]		No Livestock	
	Short Term	Long Term	Short Term*	Long Term	Short Term	Long Term	Short Term	Long Term	Short Term	Long Term
Ranch Receipts ($)	996,000	1,407,000	996,000	996,000	996,000	1,448,000	1,743,000	1,893,000	191,000	191,000
Ranch Expenditures ($)	497,000	537,000	497,000	497,000	497,000	555,000	866,000	941,000	128,000	128,000
Ranch Net Revenue ($)	499,000	870,000	499,000	499,000	499,000	893,000	877,000	952,000	63,000	63,000
Ranch Employment (Workyears)	23	25	23	23	23	26	15	16	3	3
Ranch Employment-Related Earnings[2] ($)	242,000	262,000	242,000	242,000	242,000	273,000	158,000	168,000	32,000	32,000
Yearly Construction Earnings[3]($)	28,000	NA	NA	NA	131,000	NA	37,000	NA	765,000	NA
Yearly Recreation-Related Expenditures[4] ($)	**	+ 11,100	NC	NC	**	+ 16,000	**	+ 12,000	**	+ 46,000

1 Figures for the ephemeral option under this alternative are undetermined.
2 Ranch employment-related earnings represent the total value of paid family labor and the value of paid hired labor.
3 Construction earnings represent a yearly average and will extend over a 5-year period.
4 Recreation-related expenditures represent the additional amount spent by recreationists and are based on an estimated expenditure of $20 per hunter day.
* The short term under the no-action alternative represents the existing situation for this analysis.
** Short term recreation-related earnings have not been projected.
NA = Not applicable.
NC = No change.

were proposed for intensive management. The remaining allotments were placed in the less intensive and non-intensive categories, and no rangeland improvements were proposed for them. The overall benefit-cost ratio for these nine allotments amounted to 1.5:1.

Social Attitudes and Values

No significant social impacts would result from a decision to implement the *Proposed Action*. Some groups and individuals within the area would voice approval or disapproval of any decision, but the area's social diversity would keep BLM decisions on the proposed alternatives from having significant social impacts.

SUMMARY

If implemented, the *Proposed Action* would wholly or partly meet the eight planning objectives listed in Chapter 1. Objectives for improving rangeland condition, forage production, livestock operations, wild burros, and protected plants would be met completely. Objectives for restoring deteriorated riparian habitats would be met to the extent that intensive grazing management, habitat management plans, and measures for resource enhancement are effective in protecting woody plant species and increasing broadleaf reproduction. Although big-game habitat would be greatly improved, more than 20 years might be needed for public lands in the EIS area to support reasonable numbers, and more than 10 years might be needed to reach satisfactory condition on 1 million acres of special status animal habitat.

Impacts of Continuation of Present Grazing Management (No Action)

VEGETATION

Historical overstocking and long seasons of use by livestock annually have greatly contributed to the present condition of western rangelands (Hormay, 1970). Continued yearlong use by livestock throughout the EIS area and increased numbers of burros and big game without forage allocations would result in overuse of key forage in the same areas year after year. Rangeland in unsatisfactory condition would not improve, and some areas would continue to slowly deteriorate. The 1979-80 rangeland inventory shows that the condition of much of the public rangeland has stabilized and would not greatly change in 20 years.

Plant Cover

Under *No Action,* desirable perennial plant production and cover would decline and probably be replaced by cover of less desirable species (Stoddart, Smith, and Box, 1975). Subsequent deterioration of cover would depend upon the climate and the forage value of the plants. Because many plants may not be palatable, overall changes in cover would likely be slow and of minor consequence.

The greatest decrease in cover would occur in the riparian vegetation type (52 to 47 percent), whereas cover would not change on the chaparral and pinyon-juniper vegetation types. Any decreases in cover would indicate a decline in vegetation and plant succession (Heady, 1967).

Rangeland Condition and Trend

Without changes in management or numbers of livestock and wild burros, overall rangeland condition on public lands would not change significantly in 20 years. In the short term, existing trends in rangeland condition would continue under present management for all allotments. Data gathered during the rangeland inventory in 1979-80 show that 10 custodial allotments and 10 allotments grazed yearlong have an apparent upward trend. Plant reproduction, vigor, and cover would continue to improve to an unknown extent on these allotments. The Pipeline allotment is expected to continue improving under its AMP. Forty allotments (18 custodial and 22 yearlong) show an apparent static trend and would not measurably change in rangeland condition in the long term. Ten allotments (7 custodial and 3 yearlong) show an overall apparent downward trend and could decline as much as one condition class before stabilizing. Condition on seven allotments designated for ephemeral grazing would not sharply change under present management. These allotments would be grazed only during years when ephemeral forage is abundant. No data exist for the White Tanks allotment. Present trends in rangeland condition are shown by vegetation type in Table 3-1 and by allotment in Appendix 3. Appendix 6 shows projected long-term impacts to rangeland condition.

Overall rangeland condition would decline slightly as follows: excellent from 26,400 to 25,700 acres; good from 412,500 to 412,000 acres; fair from 713,600 to 714,400;

and poor from 222,300 to 222,600 acres. Projected rangeland condition by vegetation type is shown in Table 4-2. Percent key species composition would decline on acres deteriorating to a lower rangeland condition class as shown in Table 4-3.

Riparian Vegetation

Continuing present management would cause a decline in the condition of riparian vegetation. None of the riparian vegetation would be fenced to exclude livestock and burros. Continued heavy grazing on the broadleaf tree riparian type would lower rangeland condition but not significantly change the condition of mesquite-tamarisk riparian areas. Young woody riparian vegetation would continue to be heavily grazed as grazing animals congregate in riparian areas for food, water, and shade. Key species vigor and reproduction would decrease if riparian habitat is not allowed to rest at critical growing seasons.

A total of 630 out of 840 acres would remain in excellent condition in the long term, and good and fair condition riparian vegetation would slightly decline. Riparian areas in poor condition would increase from 1,230 to 1,540 acres.

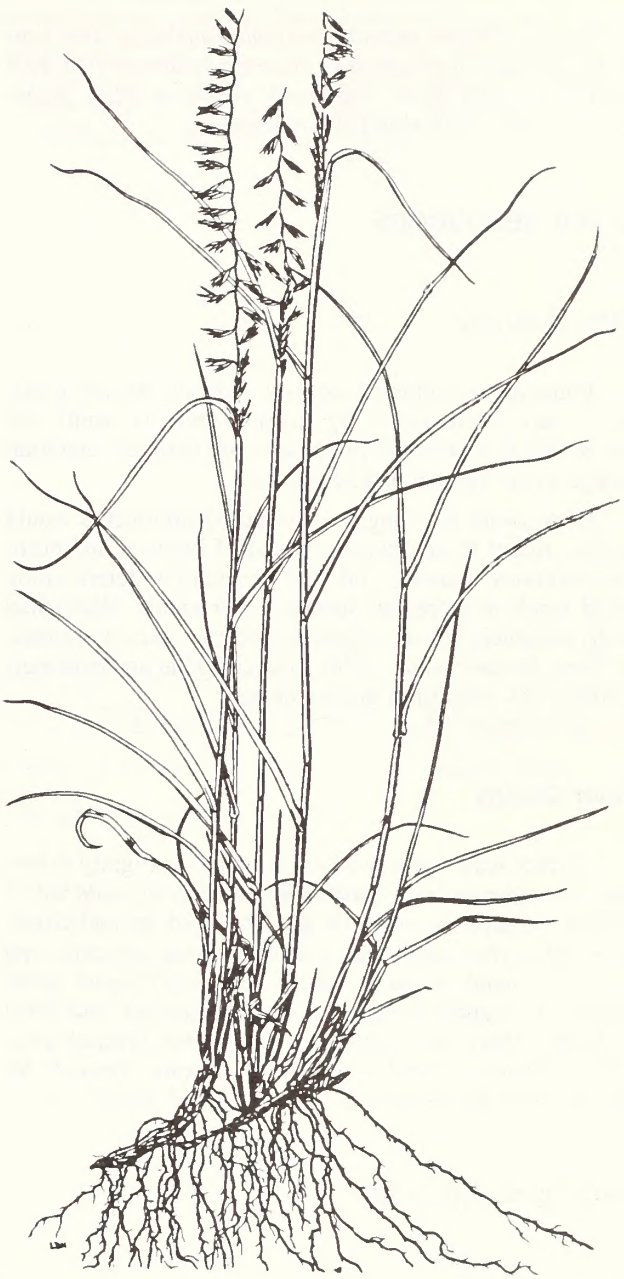
Protected Plants

Without changes in grazing management, grazing animals are expected to continue grazing and trampling protected plant species. *Mammillaria viridiflora* would continue to be impacted due to trampling and reduction of perennial grass. The sensitive riparian species, *Juncus articulatus* and *Thelypteris puberula* var. *sonorensis*, would continue to be disturbed from trampling and browsing by livestock and wild burros in Grapevine Springs and South Peoples Spring.

SOILS

Erosion and Productivity

Under *No Action* downward apparent trends on three yearlong and seven custodial allotments would lead to increased soil erosion and decreased soil productivity. Upward apparent trend on 21 allotments and static apparent trend on 47 allotments would result in slight long-term improvement or little measurable change to soil productivity and erosion levels. In riparian areas, concentrated grazing by livestock and wild burros would allow soils in moderate or severe erosion condition to continue to deteriorate. Soil erosion and soil productivity on the intensively managed Pipeline allotment and the White Tanks allotment (reserved for wildlife) should improve during the next 20 years.



Sideoats Grama

Soil Compaction

Changes in the compaction of clayey soils under different types of grazing management are summarized in Table 4-4.

Sediment Yield

Over a 20-year period, continued moderate to severe erosion in riparian zones could increase sediment yield to a heavy-to-extreme level. Sediment yields in other areas, however, would not significantly change.

WATER RESOURCES

Water Quantity

If grazing use remains constant under *No Action*, maximum water consumption by grazing animals would not change. No new water developments are planned, and total storage would remain at 130 acre-feet.

Continuous yearlong grazing on 35 allotments would increase runoff to an unknown extent. Livestock and burro concentrations causing soil and vegetation deterioration would result in increased surface water yields. Watershed cover, however, would not greatly decrease except in riparian zones. Surface water yields from custodial and ephemeral allotments would not greatly change.

Water Quality

Surface water quality would continue to slightly deteriorate on continuously grazed allotments having soils with a medium or severe erosion hazard. Reduced ground cover, increased surface disturbance from grazing animals, and poor streambank stability would adversely impact water quality in riparian zones. Increased sediment and fecal coliform pollution are probable in these areas. Overall water quality, however, would not be significantly affected. *No Action* would not measurably affect ground water.

LIVESTOCK GRAZING

Adjustments in Livestock Numbers

No Action would allow livestock grazing to continue at its present authorized grazing preference of 58,155 AUMs. If raised to authorized preference, livestock grazing would exceed the rangeland's carrying capacity on some allotments. Livestock forage would decline on overstocked allotments, and grazing animals would increase their reliance on ephemeral forage. During years of drought and low ephemeral production, the rangelands would be severely overgrazed if operators did not sharply reduce livestock numbers. The long-term value of the rangeland for livestock production would decline as the soil is depleted through erosion and invading plants replace desirable vegetation. In the long term, as many as 10 allotments having a downward trend would have to reduce their herds as livestock forage declines. Many other allotments would continue to graze at less than their grazing preference to maintain satisfactory conditions.

Ranching Operations

Allowing current grazing patterns to continue, *No Action* would not affect existing livestock operations. Existing rangeland developments would be maintained, and new developments would be built only if needed for the orderly use of the rangeland.

Livestock Performance

No Action would involve no initial livestock reductions, and livestock would not have to adjust to new systems. In the short term, high stocking rates could maintain livestock performance and ranch income. Over the long term, however, heavy stocking rates on many allotments would decrease the ability of the rangeland to produce forage and sustain grazing levels. As the rangeland's ability to produce palatable vegetation decreases, livestock performance would also decrease. With the decrease in livestock performance, ranchers would have to voluntarily reduce herd numbers. Even with these reductions, calf weaning weights would be lower than they are now.

WILDLIFE

This section evaluates the probable impacts of *No Action* on vegetation to reveal the extent of grazing impacts on wildlife. The analysis assumes that apparent trends in rangeland and habitat condition, wildlife populations, and stocking levels would continue as at present. Table 4-15 rates impacts of continuing present grazing management on wildlife and its habitat.

Big Game

Overall the productivity of mule deer habitat would not change. Allotments most affected by increased browse utilization would be Carco, Ohaco, Orosco, Aguila, Palmerita, Loma Linda, Santa Maria, and Salome Community, where cattle, mule deer, and in some cases, wild burros would most heavily compete for forage and space. Rangeland condition would continue its downward trend on 82,000 acres. Over the EIS area the decreased forage available to mule

TABLE 4-15
WILDLIFE AND HABITAT IMPACT RATINGS UNDER NO ACTION*

Alternative's Features	Big Game				Special Status Species				
	Mule Deer	Bighorn Sheep	Pronghorn Antelope	Javelina	Federal-Listed Threatened/ Endangered Species	Other Protected Species**	Upland and Small Game	Nongame Wildlife	Riparian Habitats
Grazing Use									
Vegetation Production Available Initially	2	4	2	4	2	2	3	2	1
Vegetation Production Available in 5 Years	2	4	2	4	2	2	3	2	1
Vegetation Production Available in 20 Years	2	4	2	4	2	2	3	2	1
Levels of Grazing Management									
Intensive	4	NA	NA	4	3	3	3	3	3
Nonintensive	2	2	2	3	3	2	3	2	2
Management Facilities									
Water Developments	3	2	3	2	NA	3	3	3	2
Fencing	3	2	2	3	NA	NA	NA	NA	NA
Totals (Average)	2.6	3.0	2.2	3.4	2.4	2.3	3.0	2.3	1.7
Average Rating for Alternative 2.5					Average Rating for Existing Situation 2.5				

* Rating system: 1 = most significant adverse impact; 2 = adverse impact; 3 = minor or no impact; 4 = beneficial impact; 5 = most significant beneficial impact; NA = not applicable.
** Proposed threatened or endangered species, state-listed species, BLM sensitive species.

deer might slightly decrease the deer population of public lands. Overstocking of grazing animals on grasslands would decrease cover and cause a decline in the quality of potential pronghorn habitat.

Whereas forage production in bighorn sheep habitat would not greatly change, decreased plant cover would lower habitat quality, particularly in the foothills. Declines would be most evident in the Ohaco and Orosco allotments.

Javelina would continue to increase on public land, but slowly over the long term. Intense competition between all forage users on a static or diminishing resource base would limit the increase (Table 4-10).

Existing fences would interfere with big-game movement in certain areas, causing entanglement and some deaths.

Other Wildlife

Expected reductions in plant cover in favored habitat (Table 4-1) and continued livestock disturbance would cause waterfowl and shorebird habitat to deteriorate by 10 percent in the long term.

Upland and small-game habitat and populations would decline or remain unchanged. Perennial forage in upland and small-game habitats would decline by 11 percent in the long term, forcing a greater reliance on ephemerals. Gambel's quail populations would fluctuate more than at present from reduced forage (Gallizioli, 1960). Mourning dove populations would probably not noticeably decrease. Over the long term, white-winged dove populations would decrease with the continued deterioration of habitat cover. Continued rangeland deterioration would probably not significantly affect desert cottontail and jackrabbit populations.

Nongame habitat would noticeably change. Decreased plant cover and increased use of the remaining forage would mainly affect the lower layers of vegetation most needed by nongame. About 937,000 acres of habitat would lack sufficient cover for nongame needs, representing a 1 percent increase in deteriorated habitat. Buttery and Shields (1975) and Wiens and Dyer (1975) discussed these relationships between rangeland condition and nongame birds. The quality of nongame habitat in riparian areas would greatly decline in the long term, and riparian habitat condition would remain far below its potential.

Protected and Sensitive Species

Protected and sensitive wildlife habitat would slightly degrade with declining cover and food. Cover in aquatic and riparian bald eagle habitat would decline by 5 percent (Table 4-1). Eagles would have fewer trees to roost in, and prey populations would decline in the long term as aquatic habitats become simpler and less productive. Use of the Bill Williams-Santa Maria drainage would diminish. In the long term, potential peregrine falcon habitat would be far less likely ever to support breeding pairs.

The production of herbaceous forage would decline in desert tortoise habitat, bringing greater pressure from all herbivores on the winter-spring annuals. Desert tortoise populations would greatly suffer. In all but the wettest years, desert tortoises might not reproduce. In the long term, the tortoise populations would drop below their maintenance level of 50 tortoises per square mile (Berry and Nicholson, 1979), below which their population cannot recover.

No Action would have the following impacts on other protected and sensitive wildlife.

- Black hawk populations would remain unchanged in the short term. In the long term, they would sharply decrease as nest trees die out. A lack of suitable nesting habitat would result. By the end of the 20-year period, few if any black hawks would remain.
- Zone-tailed hawks would be less affected than black hawks because of their wider distribution. In the long term, however, zone-tail numbers would decrease as suitable nesting trees become rarer.
- Great egrets, snowy egrets, and black-crowned night herons would continue to use stock tanks, denuded areas around Alamo Lake, and sections of the Bill Williams, Santa Maria, Hassayampa, and Big Sandy Rivers as stopovers during migration. They would not, however, breed in the EIS area.
- Gilbert's skink populations would be reduced in the long term because of reduction in plant cover. The lizard would be restricted to chaparral only, a 55 percent decrease from the present habitat area of 37,000 acres.
- The Gila monster's habitat would decline, primarily due to declines in prey resulting from reduced plant cover.
- The Sonoran mountain kingsnake would decrease in relation to its prey base. The prey base would be reduced due to loss of adjacent riparian cover in kingsnake habitat.
- The ferruginous hawk would continue to winter in the EIS area but would not breed.
- Sharp-shinned and Cooper's hawks would continue to exhibit poor nesting success in and near 10,500 acres of riparian habitat due to continued heavy livestock or burro use.
- Prairie falcon foraging habitat would remain unchanged or slightly improve on 2,000 acres of public land.

Riparian Habitat

Riparian habitat would continue to degrade so that only 640 acres of broadleaf riparian vegetation would be in better than fair condition in the long term. Dependent wildlife species would greatly decline, seriously impacting the integrity of this biologically rich area. The 9,000 acres of mesquite riparian vegetation would not significantly change.

WILD BURROS

Under *No Action*, BLM would hold the EIS area's wild burro population to 610 but would allocate no forage for them. Even without forage allocations, burros would continue to use 3,600 AUMs of forage and 3.36 acre-feet of water, affecting 21 allotments. This continued yearlong use would result in continued adverse impacts around the waters (trampling, heavy vegetation use, soil compaction, and competition for water) and trampling of desert tortoise habitat and various protected plant species.

If livestock grazing was sustained at full authorized grazing preference, unallocated burro and wildlife use could cause a decline in range productivity and a decline in the health of the remaining burros. During drought, these impacts could be severe.

Although maintaining burro numbers at a high level would leave a large genepool of various burro colors and traits, the following adverse impacts would also result.

- Federally managed burros would continue to trespass on adjacent state and private lands where they would compete for nonfederal forage and interfere with private land use.
- Burros would continue to heavily use vegetation and degrade resources at Alamo Lake and along the Bill Williams and Santa Maria Rivers. This level of use would severely conflict with management objectives for Alamo Lake State Park and Ocotillo Wildlife Area administered by the Arizona State Parks Department and the Arizona Game and Fish Department, respectively.
- Managing 610 burros would require removing 70 to 100 head yearly to maintain the required numbers.
- Rounding up or trapping excess burros would cause stress for the removed animals. Wildlife, livestock, and uncaptured burros disturbed during removals would also temporarily undergo stress.

BLM Proposed Roundups to Remove Excess Burros

BLM proposes to remove excess wild burros from the public lands to protect sensitive resources and maintain healthy burro populations. BLM would employ various means, including roundup by horseback pictured above, to capture excess animals and would offer them for adoption to qualified individuals.

CULTURAL RESOURCES

As shown in Table 4-8, *No Action* would slightly increase impacts to cultural resources. Although BLM proposes no rangeland developments, the construction of some operator-built projects could destroy undiscovered sites. Vandalism of cultural resources would also continue. Stocking levels could reach the authorized grazing preference, which would moderately increase impacts from livestock grazing. The present trend toward greater deterioration of cultural resources would continue.

RECREATION

No Action would slightly decrease hunting opportunities in the EIS area. Combined deer and javelina populations could decrease by 60 animals, decreasing annual big-game hunting by 150 visitor days. Changes in small and upland game hunting visitor days would depend on population changes, which cannot be estimated with accuracy. Opportunities for viewing wildlife would slightly decrease with decreases in big game. See Tables 4-10 and 4-11.

VISUAL RESOURCES

Under *No Action*, no new rangeland developments are proposed, and overall vegetation condition would remain static. No impacts are expected on visual resources. For criteria and methodology, see BLM Manual, Section 8400.

WILDERNESS VALUES

Lands in the EIS area established as wilderness study areas are being managed according to BLM's *Interim Management Policy and Guidelines for Lands under Wilderness Review* (BLM, 1976b). No impacts on wilderness values would occur from continuing present grazing management.

ECONOMIC AND SOCIAL CONDITIONS

Economic Conditions

Ranch Budgets

Under the *No Action* alternative, ranches in the EIS area would keep their authorized grazing preference. Ranches would be allowed to stock cattle up to this grazing preference, but, as in the past, many would probably continue to stock at lower levels. The financial situation depicted by the typical ranch budgets is thus expected to continue under *No Action*.

Ranch Finance

No Action should not change ranch values or the rancher's ability to borrow operating and long-term capital.

Regional Economics

Livestock sales and livestock-related employment and income are expected to remain at existing levels, and *No Action* would not impact the study area's economy. Rangeland developments may be built under this alternative if they are needed for the orderly use of the rangeland. The need for these developments cannot be projected nor can construction-related employment.

After 20 years, annual recreation use in the EIS area would decrease by 150 visitor days. Annual recreation-related spending would decline by $3,000 after the 20th year, an amount insignificant to the study area's economy.

Benefit-Cost Analysis

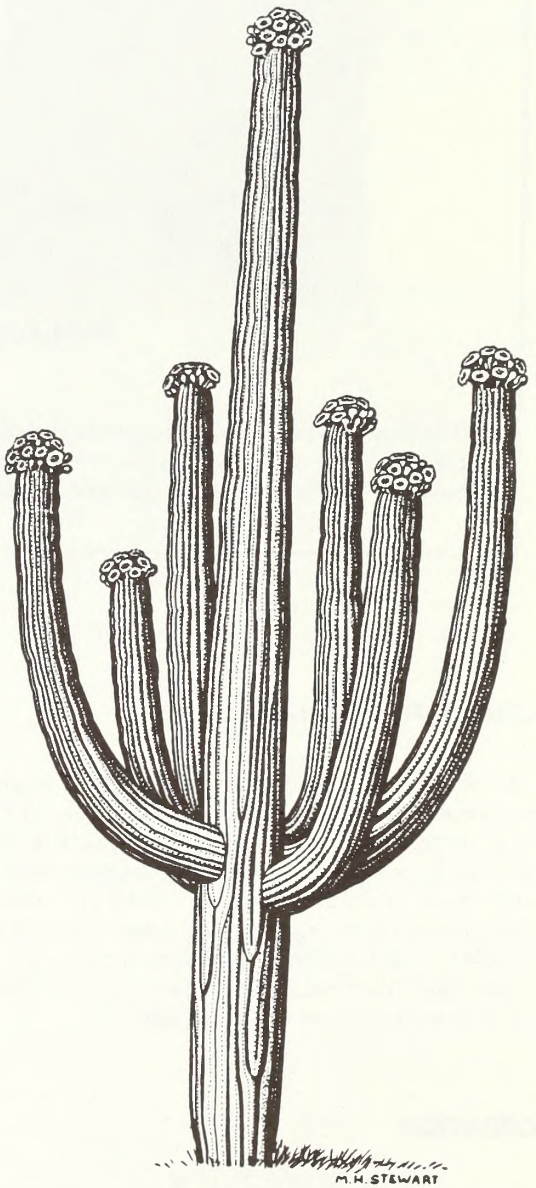
Because of a lack of quantifiable information on the benefits expected under continuation of present grazing management, a benefit-cost analysis was not conducted.

Social Attitudes and Values

No significant social impacts would result from continuing present grazing management. Some groups and individuals within the area would voice approval or disapproval of any decision, but the area's social diversity would keep BLM decisions on the proposed alternatives from having significant social impacts.

SUMMARY

The *No Action* alternative would meet none of the eight planning objectives listed in Chapter 1. In the long term, vegetation, wildlife, wild burros, riparian habitat, and special status plants and animals would continue to be adversely impacted. Grazing operations would suffer from gradual declines in rangeland condition and overgrazing in some areas.



Saguaro

Impacts of Intensive Grazing Management (Intensive Grazing)

VEGETATION

Intensive grazing management would benefit vegetation on 36 intensively managed allotments involving 1,095,300 public acres. Vegetation on 43 nonintensively managed allotments involving 297,700 public acres would undergo little change in 20 years.

Intensive grazing management, rangeland developments, and moderate utilization of key forage plants (40 to 60 percent) would increase vegetation production 6 percent from 490 million to 520 million pounds in the long term (Table 2-5). The most rapid improvement would occur on high-response areas that are already improving. Low-response areas would not greatly change in the long term.

Plant Cover

As under the *Proposed Action*, *Intensive Grazing* would lead to increased cover but over a larger percentage of the EIS area. Grazing treatments on 36 allotments would allow rest during critical growing periods. As key species regain vigor and seedlings become established, cover would increase. In addition, undesirable plant cover would decrease as desirable species become established. Most increases in plant cover would occur on allotments proposed for intensive management. Cover on nonintensively managed allotments would not greatly change except on allotments currently improving where slight increases might occur.

Table 4-1 shows that the greatest change in cover would occur in the chaparral vegetation type (52 to 58 percent) as the result of intensive management in the Harcuvar and Harquahala Mountains. On the other hand, cover in the pinyon-juniper and grassland types would not significantly change.

Rangeland Condition and Trend

In the long term, applying intensive grazing management to 36 allotments would significantly improve rangeland condition. Grazing treatments would provide rest, improve livestock distribution, and hold utilization to moderate levels, thereby improving the vigor, reproduction, and seedling establishment of key plant species. Downward trends on three allotments would stabilize or reverse themselves, and condition would improve on 22 allotments with apparent stable trends and 11 allotments with apparent upward trends.

In the short term, condition on 43 allotments proposed for nonintensive management would continue to follow existing trends. Ten allotments with an upward apparent trend would continue to improve. The 25 allotments in stable condition would show little change, while 7 allotments with declining trend would be monitored to determine if any changes in livestock grazing are needed to prevent damage to public lands. No data exist for the White Tanks allotment.

Under *Intensive Grazing*, rangeland condition would improve as follows: excellent from 26,400 to 149,400 acres, good from 412,500 to 558,500 acres, fair from 713,600 to 492,800 acres, and poor from 222,300 to 174,000 acres. Projected rangeland condition by vegetation type is shown in Table 4-2. Long-term impacts to rangeland condition are shown in Appendix 6.

Riparian Vegetation

Improved condition in riparian areas would result from lower utilization, rest during critical growth periods, and specially designed grazing treatments. Intensive grazing management and measures for resource protection and enhancement listed in Chapter 2 would allow desirable riparian species to regain vigor, increase in cover, and increase reproduction. Herbaceous vegetation would show the greatest response. Woody species in riparian areas under nonintensive management would improve to the extent that habitat management plans or other protective measures are effective in curtailing high utilization of young seedlings.

Plant cover in riparian areas would increase from 52 to 57 percent. Rangeland condition would improve as follows: excellent from 840 to 2,500 acres, good from 5,070 to 4,900, fair from 3,940 to 3,230 acres, and poor from 1,230 to 440 acres (Table 4-2). Key species composition would correspondingly increase as rangeland improves into the next condition class as shown in Table 4-3.

Protected Plants

Under *Intensive Grazing*, vegetation allocations and minimum rest requirements would benefit protected plants by lowering utilization, improving plant vigor, and increasing reproduction on intensive allotments. Three protected plant species would be impacted by grazing. The remaining five protected plants are not preferred browse, and the effects of grazing have not been identified as limiting factors for these plants (Butterwick, 1981). See Table 3-3.

Oases Support Rare Desert Plants

Delicate ferns (*Thelypteris puberula* var. *sonorensis*) and other plants uncommon to the desert may be found only in a few isolated spring sites within the EIS area. The plants are easily disturbed and may be affected by grazing animals. State and federal agencies have given protected status to many of these plants. BLM has proposed designating areas such as the one pictured above in Peoples Canyon as areas of critical environmental concern to prevent degradation of these sensitive habitats.

Mammillaria viridiflora, found in the chaparral vegetation type of the Harquahala Mountains, is not grazed by livestock but needs perennial grasses for protection and moisture. Under *Intensive Grazing*, it would improve through the protective measures discussed in Chapter 2, which would include a fenced exclosure. Intensive grazing management on the Aguila allotment would include measures to ensure this plant's protection.

Juncus articulatus and *Thelypteris puberula* var. *sonorensis* are riparian species that occur in Grapevine Springs and South Peoples Spring respectively. *J. articulatus* would be protected through the proposed AMP on the Santa Maria allotment. *T. puberula*, which occurs on the Van Keuren allotment, would be protected through a habitat management plan. BLM has proposed these two spring sites as areas of critical environmental concern (ACECs) and would incorporate specific measures for protection into the ACEC management plans.

SOILS

Erosion and Productivity

Under *Intensive Grazing*, soil erosion on 35 intensively managed allotments would decrease, primarily due to improved grazing practices including moderate utilization. As a result, ground cover and soil productivity would increase. These projections reflect professional judgment based on rangeland inventory data and projected impacts to vegetation. In riparian areas, soils in a moderate and severe erosion condition are expected to improve, since grazing pressure from livestock and burros would decrease.

Soil Compaction

Table 4-4 summarizes changes in the compaction of clayey soils under the different types of grazing manage-

ment. Soil compaction would increase at most new reservoirs, spring developments, and well sites, but the acreage affected would be small and insignificant.

Construction of rangeland developments under *Intensive Grazing* would temporarily disturb 115 acres of soil and permanently occupy 43 acres. The plants and soils disturbed would need 3 to 10 years to recover because of low rainfall (BLM, 1978). During the construction and recovery period, soil compaction and the removal of ground cover would increase soil erosion potential. As vegetation and litter increase, however, soil erosion rates should decline and become insignificant (Table 4-4).

Sediment Yield

Under the *Intensive Grazing* alternative, sediment yield would slightly decrease. In areas producing moderate amounts of sediment annually, 0.5-1.0 acre-feet per square mile, sediment yield would decline due to increased effective ground cover and reduced grazing pressure. Sediment yield in riparian zones would decline due to reduced livestock and burro grazing. Sediment yield in most of the remaining areas, having a negligible or slight sediment rating, would not greatly decrease.

WATER RESOURCES

Water Quantity

Assuming that long-term forage increases of 8,700 AUMs under *Intensive Grazing* would lead to increased grazing, maximum consumption of water by grazing animals could increase from 63 to 72 acre-feet. New water developments on 36 intensively managed allotments would increase storage from 130 to 182 acre-feet but would not significantly affect ground water. Surface water yields would be slightly reduced by the construction of 21 reservoirs.

Decreased surface water yields from intensively managed allotments would result because of increased infiltration and greater soil moisture deficits caused by increased vegetation. Since over 75 percent of the public land in the EIS area would be intensively managed, decreased runoff could be a significant impact. Antecedent soil moisture and rainfall intensity, however, would far greater affect runoff than would levels of grazing management.

Water Quality

As grazing systems improve livestock distribution, reduce grazing pressure in overgrazed areas, and improve vegetation, surface water quality would slightly improve. High sediment and coliform rates would still follow intense summer thundershowers and long-duration winter storms.

Water quality in riparian zones would benefit from increased rest, reduced grazing pressure, lower utilization, increased vegetation production, and fenced exclosures. *Intensive Grazing* would not measurably affect ground water.

LIVESTOCK GRAZING

Adjustments in Livestock Numbers

Intensive Grazing would initially reduce allowable livestock numbers on public lands by 16 percent from authorized grazing preference but increase allowable livestock numbers 7 percent over the past 5-year (1976-1980) average licensed use.

Licensed use on small ranches in the EIS area would be reduced by an average of 11 percent from authorized grazing preference. All small ranches except Orosco would be adjusted to the past 5-year average licensed use. Orosco would keep its authorized grazing preference. Increases in forage production 20 years after implementation could allow stocking levels on small ranches to increase to an average of 22 percent above the 5-year average licensed use or 2 percent above the authorized grazing preference.

Medium-size ranches would be initially reduced by an average of 10 percent from the authorized grazing preference. Leidig and Loma Linda allotments would keep their authorized grazing preference, and all other medium-size ranches would be adjusted to the past 5-year average licensed use. Twenty years after implementation, increases in forage production could allow stocking levels to increase to 4 percent above the present authorized grazing preference.

Initial adjustments would reduce livestock numbers on large ranches by an average of 24 percent from authorized grazing preference, and all allotments except Lamberson would be adjusted to the past 5-year average licensed use. Lamberson would keep its authorized grazing preference. Forage increases over a 20-year period after implementation could permit average stocking levels on large ranches to increase to within 15 percent of authorized grazing preference.

Table 3-5 groups allotments by ranch size. Appendix 2 shows initial and projected allocation by allotment.

Ranching Operations

The intensive grazing management alternative would place 36 allotments, involving 33 operators, under intensive grazing management. These allotments would generally

shift from continuous or sporadic grazing to grazing systems with periodic rest and seasonal deferment. Intensive grazing management would require an increase in operator labor to monitor herds, maintain pasture fences, and move livestock from pasture to pasture. Proposed water developments would improve livestock distribution within allotments. Better distribution and stocking at proper levels would also reduce grazing pressure in overgrazed areas. Over time, key forage species production would increase, and vigor would improve, increasing the quality and the quantity of forage grazed by livestock.

Implementing intensive management would require many rangeland development whose construction would increase operator workloads and expenses. These additional costs would be a relatively short-term impact, but increased maintenance costs would amount to a long-term impact. The Pipeline allotment, now under an intensive grazing system, would not change its operation.

Thirty-five allotments would continue to be nonintensively managed with no change in management or impact. Ephemeral grazing would continue on seven allotments, involving seven ranches. Management of these allotments would not change.

Livestock Performance

Intensively managed grazing would require livestock to change grazing habits. Livestock would have to adapt to new terrain, water sources, increased concentrations, and more frequent handling and movement. At first, the stress of this change could cause weight loss. As livestock adapt to the new systems, however, their performance would improve. Over time, grazing systems would improve rangeland conditions. The more desirable forage species for livestock would increase, improving weight gains and calf crops and reducing death loss (Table 4-6).

Fencing of pastures and allotment boundaries would permit greater control over livestock and help in detecting livestock trespass. Grazing systems would further benefit livestock production by requiring operators to handle, move, or work their livestock more regularly. Ranchers would be in a better position to care for their animals and to monitor animal health, quality, and breeding. Livestock performance would not measurably change on nonintensive allotments.

WILDLIFE

Introduction

Under *Intensive Grazing* most significant wildlife impacts would not occur in the short term but would be evident in the very long term (over 20 years), as vegetation changes. Livestock stocking would be closely monitored and adjusted as needed on 36 allotments (over 1,095,000 acres), and burro numbers would be reduced. A total of 298,000 acres would remain relatively unchanged. Adjusting livestock and burro numbers and maintaining present big-game numbers would reduce competition among forage users and in the long term bring grazing in line with the carrying capacity of the rangeland. Cumulative improvement would be relatively great (Figure 2-1). Table 4-16 rates the impacts of this alternative on wildlife and its habitat.

Ephemeral grazing on perennial-ephemeral allotments could conflict with some nongame requirements in habitats below 3,500 feet elevation by increasing wildlife-livestock competition for productive annual blooms that provide energy for wildlife reproduction.

Intensive management on 36 allotments would provide periods of rest from livestock grazing and ensure moderate utilization to eventually improve rangeland condition and increase forage production. As under the *Proposed Action*, significant habitat improvement cannot be predicted for rest treatments on intensively managed allotments because different systems have different effects (BLM, 1979c). Impacts can with certainty be projected only after allotment management plans with specific treatments and systems are developed. Rested pastures, however, would temporarily provide increased forage and cover for wildlife. Grazing systems on the Pipeline allotment have led to numerous improvements in small-game and nongame habitats, and new waters and increased browse production have benefited big game.

Nonintensive management on 35 allotments would allow yearlong grazing and require no rest treatments. Wildlife habitat would continue to improve or decline along present trends, depending on grazing management practices. Habitat would not significantly improve in these areas unless, as a result of monitoring or mitigation, livestock operators reduce grazing pressure or improve grazing management.

Ephemeral grazing management on seven allotments would benefit perennial vegetation, since in most years the land would be rested from livestock use from June through January. Conflicts with the desert tortoise are not expected to be significant, since most crucial habitat lies outside ephemeral allotments. Potential conflicts near the Buckskin Mountains could be partially mitigated by measures for resource protection described in Chapter 2. Wildlife would otherwise be impacted the same as by rest treatments under intensive management, except benefits would be greater due to more frequent rest.

Intensive grazing management calls for several rangeland developments, which would permanently remove 43 acres of habitat from production. Two types of facilities are proposed: water developments and fences.

TABLE 4-16
WILDLIFE AND HABITAT IMPACT RATINGS UNDER INTENSIVE GRAZING*

Alternative's Features	Big Game				Special Status Species				
	Mule Deer	Bighorn Sheep	Pronghorn Antelope	Javelina	Federal-Listed Threatened/ Endangered Species	Other Protected Species**	Upland and Small Game	Nongame Wildlife	Riparian Habitats
Grazing Use									
Vegetation Production Available Initially	2	4	2	4	2	2	3	2	1
Vegetation Production Available in 5 Years	2	4	2	4	2	2	3	2	3
Vegetation Production Available in 20 Years	5	4	3	4	4	4	4	4	4
Levels of Grazing Management									
Intensive	4	4	4	4	4	4	4	3	4
Nonintensive	3	NA	NA	3	2	2	3	2	3
Management Facilities									
Water Developments	4	4	3	4	NA	4	4	4	NA
Fencing	3	2	2	3	NA	NA	NA	NA	NA
Totals (Average)	3.3	3.7	2.7	3.7	2.8	3.0	3.5	2.8	3.0
Average Rating for Alternative 3.2					Average Rating for Existing Situation 2.5				

* Rating system: 1 = most significant adverse impact; 2 = adverse impact; 3 = minor or no impact; 4 = beneficial impact; 5 = most significant beneficial impact; NA = not applicable.
** Proposed threatened or endangered species, state-listed species, BLM sensitive species.

Sixty-nine water developments are proposed for the intensively managed grazing allotments (Table 2-6). Most are expected to provide year-round water. Heavy forage utilization, trampling, and trailing in an average 750-foot radius around the new waters would greatly deteriorate vegetation on 2,800 acres, forming disturbed areas. More waters, however, should benefit several species, as water is a primary factor limiting habitat quality. The increase in water would also increase competition for some species.

Fencing would extend through 19 allotments for 122 miles, permanently disturbing 13 acres of habitat. Fencing would only negligibly impact wildlife other than big game.

Big Game

Vegetation production on mule deer habitat would increase 6 percent. Most improvement would occur on the following allotments: Aguila, Moralez, Wickenburg, Coughlin "A", Sky Arrow, Loma Linda, and Desert Hills. Competition for forage and space would decline in the long term (Hawkes and Furlow, 1978), since over 270,000 acres of deer habitat would improve to good and excellent rangeland condition. Mule deer habitat would be rested in a patchwork pattern over 1,095,000 acres in 36 allotments. The rest would provide plenty of deer forage in at least one pasture per allotment. Mule deer, however, might not fully use rested pastures because they are creatures of habit reluctant to move into new areas.

More waters in mule deer habitat would benefit deer by expanding their ability to forage in new areas. On the other hand, 69 water developments would significantly extend the range of livestock into areas that have previously been only lightly grazed. As a result, livestock and deer would compete more for browse and space.

An additional 122 miles of fence would run through mule deer habitat on several allotments. Although fences would be designed to reduce deer mortality, an unknown number of deer might still suffer from entanglement. Fences would also disrupt use patterns until deer learn to cross them.

Potential pronghorn habitat would not significantly change under *Intensive Grazing*.

The forage productivity of desert bighorn sheep habitat on four allotments (as determined by plant cover) would increase by 13 percent in the long term, reducing competition

Good Rangeland Management Would Help Desert Bighorn Sheep

Historically, bighorn sheep ranged throughout much of the wildlands in the EIS area. Pressure from man's activities in recent times, however, led to reduced herd sizes and diminishing use areas. Alternatives for grazing management would provide new water sources, improve forage production, reduce impacts in crucial habitats, and remove wild burros that compete for food, water, and space.

for forage and space among bighorn sheep, cattle, and wild burros. Over 69,000 acres would improve from poor to fair to good and excellent condition, allowing bighorn to use more of the foothills and adjacent mountains. Carrying capacity could increase by 84 percent in the long term. About 30 burros, however, would remain in the Ekvall and Bar D 4 allotments, where they could compete with reintroduced bighorns.

Reduced forage competition among all users would allow javelina to continue to increase in numbers and become better distributed throughout the EIS area. Javelina would benefit by using rested pastures in the short term. They would also benefit from the long-term increase in production expected from the grazing treatments. New waters would benefit javelina by increasing the size of their foraging areas.

Other Wildlife

Increases in grass and forb cover (Table 4-1) would be partially offset by continued livestock disturbance in riparian habitat and at water sources. Plant cover would increase over 20 years (Hughes, 1978), overall improving waterfowl and shorebird habitat.

The productivity of upland and small-game habitat would increase by 6 percent in the long term. Gambel's quail populations would fluctuate less than at present, and quail numbers during high rainfall years could be higher than at present. Mourning dove populations would increase slightly due to a lessening of nest disturbance by livestock, especially where doves ground-nest. White-winged dove habitat would improve with a long-term increase of riparian plant cover, and white-wings might benefit more than evidenced by cover improvement alone (BLM, 1980). Desert cottontail and jackrabbit populations would probably not greatly change.

Nongame habitat would notably change under intensive grazing mangement. The 6 percent increase in forage production, increased plant cover (most evident on 123,000 acres), and decreased competition for perennial forage would mainly affect the lower layers of vegetation needed for cover by many nongame species. Habitat with improved ground cover would increase by over 60 percent, although such cover would still be lacking on 669,000 acres in the EIS area.

The quality of nongame riparian habitat would continue to decline with the loss of riparian trees in the short term (BLM, 1979c). In the long term, nongame riparian habitat would dramatically improve as several layers of riparian vegetation develop. Riparian habitat would still remain below its potential.

Protected and Sensitive Species

Protected and sensitive wildlife habitat would continue to degrade for some species but improve for most others. The productivity of aquatic and riparian bald eagle habitat would increase in the long term. Although roost trees would be fewer in the short term, in the very long term (over 20 years) they would increase, improving eagle habitat. Potential peregrine falcon habitat would continue to exist with improved likelihood of supporting breeding pairs in the long term.

Also in the long term, forage productivity would increase on 17 allotments in desert tortoise habitat. In the short term, competition between the tortoise and other forage users would slightly decline on winter-spring annuals, which would increase desert tortoise reproduction. The populations should improve slightly in the long term.

Intensive Grazing would have the following impacts on other protected or sensitive species.

• Black Hawk populations would not greatly change in the short term. In the long term, black hawk habitat and populations would slightly decline as nest trees die off, removing suitable nesting habitat. In the very long term (beyond 20 years) trees would reach a size suitable for nesting, improving habitat quality in the broadleaf areas.

• Intensive grazing management would affect zone-tailed hawks less than black hawks because of the zone-tail's wider foraging and breeding distribution. In the long term zone-tail numbers could decrease with increasing scarcity of nest trees near unprotected springs and along some riparian drainages.

• Great egrets, snowy egrets, and black-crowned night herons would continue to use denuded areas around stock tanks, Alamo Lake, and sections of Hassayampa, Santa Maria, Bill Williams, and Big Sandy Rivers as stopovers during migration. But they would probably not breed in the EIS area because cover would be lacking.

• Gilbert's skink populations would increase in the long term due to a 4 percent increase in plant cover in their preferred habitats.

• The quality of Gila monster habitat would improve, primarily because of increases in prey base. Prey would increase as a result of increased plant cover.

• The Sonoran mountain kingsnake populations would not increase, since plant cover and prey levels would remain unchanged on 2,100 acres of nonintensively managed habitat.

• The ferruginous hawk would continue to winter in the planning area, but habitat would remain unchanged on 2,600 acres of nonintensively managed grassland habitat.

• Sharp-skinned and Cooper's hawk habitat would improve on 2,750 acres. A total of 32,100 acres of habitat would remain little changed in the long term. Periods of rest from livestock use during the nesting season would improve nesting success (Millsap, 1981).

• Prairie falcon foraging habitat would slightly decline as 257,000 acres of habitat improve to fair and good rangeland condition classes in creosotebush and paloverde habitat.

Riparian Habitat

In the short term, riparian habitat quality would continue to gradually decline along present trends. In the long term, intensive grazing management and resource-enhancing measures would lead to reproduction of broadleaf trees. Young trees would eventually replace older decadent trees on 1,400 acres, amounting to 66 percent of the broadleaf riparian habitat. In the remaining 34 percent of habitat not proposed for intensive management (700 acres), young cottonwoods, willows, and ashes would not become established to replace old trees without effective controls on grazing animals (BLM, 1979c; Hughes 1978). Habitat quality in these areas would decline through the long term unless intensive management is implemented through effective grazing practices or habitat management plans to protect woody plant species and ensure broadleaf reproduction. On the 1,400 acres under intensive management (portions of Babcock, Coughlin, Palmerita, Santa Maria, and Sky Arrow allotments), rest periods would be tailored to allow the several years needed for seedlings of favored woody plants — cottonwood, Goodding willow, and velvet ash (Martin, 1979) — to grow to heights beyond the reach of livestock (BLM, 1979c). Under habitat management plans and allotment management plans calling for tree plantings, exclosures, and other measures, habitat would improve on all 2,100 acres in the long term.

WILD BURROS

Intensive Grazing would eliminate burro use from three use areas (12 allotments) and reduce the Alamo herd from 300 to 200. Vegetation and crucial wildlife habitat within the burro use areas would benefit from the reduced competition for 2,400 AUMs of forage and 2.2 acre-feet of water currently used by burros. In addition, removing wild burros from the Little Harquahala Mountains would alleviate management problems of trespass burros in the farmland and subdivisions around Salome. A well-managed herd in the Alamo Herd Management Area (HMA) along with interpretive signing would provide opportunities for public viewing and enjoyment.

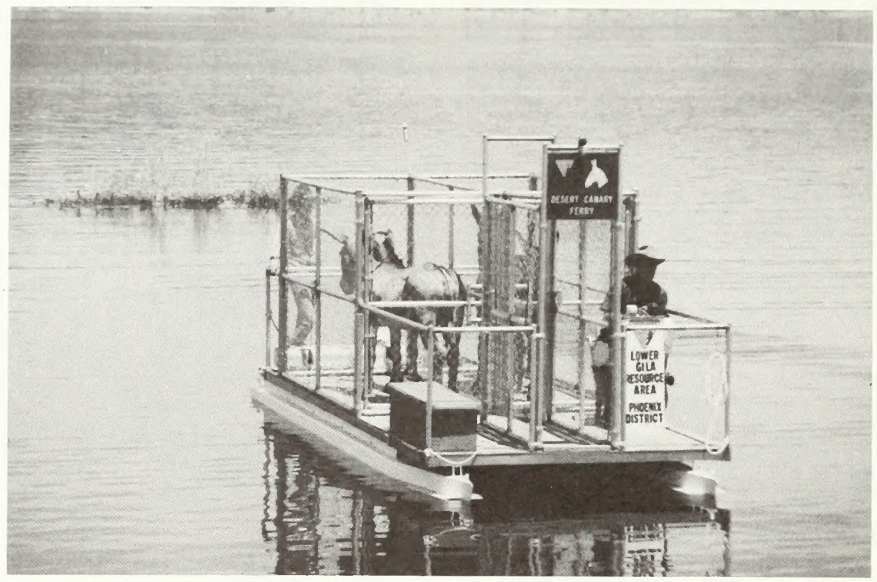
Intensive Grazing would lead to the following adverse impacts.

• The removal program would cause temporary stress in the animals removed or disturbed in the chase, including wildlife and livestock.

• Eliminating burros from the Harquahala-Big Horn Mountains would remove a genepool source of red burros and white burros, which are rare in Arizona. From 10 to 15 red or white burros are believed to exist in this area.

• Protecting the riparian habitat along the Bill Williams and Santa Maria Rivers for wildlife habitat through fencing and other management actions could inhibit burro access to stretches of water and the river bottom forage — bermuda grass, mesquite leaves, and mesquite beans. In the worst-case situation, new fencing along the river and on the Santa Maria and Palmerita allotments could reduce the free-roaming behavior of burros and restrict the genepool by fragmenting the herd. Field observatios indicate, however, that livestock fences do not greatly impede burro movement (Durfee, 1981).

• As many as 30 burros would remain in the Bar D 4 and Ekvall allotments at the east end of the Alamo HMA and would adversely impact protected plant areas, raptor



Wild Burro Management Requires Innovation

During a recent burro roundup around Alamo Lake, BLM resorted to a wild burro barge to transport animals across the lake, thus saving hours of vehicle transport and wear on the animals. In future roundups BLM would continue to seek improved ways of gathering animals that reduce costs and lessen burro stress.

areas, and proposals for bighorn reintroductions. Wild burros intermittently using solidly blocked nonfederal lands in these allotments would continue to cause problems for the state and private land owners.

• Continued burro use of the area around Alamo Lake administered by the Corps of Engineers would interfere with land and resource management by the Corps, the Arizona Game and Fish Department (AG&FD), and the Arizona State Parks Department. Burro requirements for forage and water from the area conflict with AG&FD plans to fence the lake and create waterfowl habitat by planting small-grain crops in the river bottom and at the headwaters of the lake.

• Creating and managing the Alamo HMA with a herd of 200 burros would affect eight grazing allotments and require the annual commitment of 1,200 AUMs of forage and 1.1 acre-feet of water. Further costs would accrue from the monitoring and management of the herd and from the removal of 75 animals every 3 years to maintain the population level.

CULTURAL RESOURCES

Intensive Grazing would greatly increase adverse impacts to cultural resources (Table 4-8). The numerous proposed rangeland developments could destroy undiscovered cultural resources, and vandalism would increase due to more use of and access to rangeland facilities. Since initial stocking rates would be determined by average licensed use from 1976 to 1980 — a 16 percent reduction from the authorized grazing preference — livestock grazing impacts could slightly decrease in the short term.

RECREATION

Intensive grazing management would measurably impact hunting and negligibly impact off-road vehicle (ORV) use and sightseeing. Big-game (deer and javelina only) populations could increase by 1,170 animals, increasing by 800 the estimated annual big-game hunting visitor days. Change in small and upland game could increase or decrease hunter use visitor days, although these changes cannot be estimated with accuracy. Increases in game would slightly increase opportunities for viewing wildlife. On the other hand, the 122 miles of proposed fencing would slightly decrease ORV cross-country opportunities. See Tables 4-10 and 4-11.

VISUAL RESOURCES

Vegetation increases resulting from *Intensive Grazing* could change the color and texture of the landscape. Any change would be gradual and most evident along roads. Although contrast ratings will be completed, 122 miles of fence and 38 well developments would cause some visual contrast in the landscape. Of the four basic visual resource management elements (form, color, texture, line), line and form contrasts would be most evident. For criteria and methodology, see BLM Manual, Section 8400.

WILDERNESS VALUES

On lands in the EIS area established as wilderness study areas, all rangeland management activities will comply with BLM's *Interim Management Policy and Guidelines for Lands under Wilderness Review* (BLM, 1979b). No adverse impacts on wilderness values are expected.

ECONOMIC AND SOCIAL CONDITIONS

Economic Conditions

This section describes the economic impacts to the EIS area ranchers and the community from *Intensive Grazing*, including impacts from expected changes in construction income and outdoor recreation use.

Ranch Budgets

Small Ranch. Under *Intensive Grazing* management, the herd size of the typical small ranch would remain at the 5-year average licensed use. Thus in the short term, the typical small ranch size would remain at 48 cows, and revenue, expenses, and net income would not change. Long-term forage increases, however, would allow this typical ranch to stock 55 cows, a 14 percent increase over the existing stocking level. Yearly net revenue at first would remain at $5,302, but long-term forage increases and improved calf crops and calf weights would increase yearly net revenue to $7,757 after 20 years.

To determine whether over a 20-year period the typical small rancher would be financially better off under continuation of present management or one of the other alternatives, BLM economists calculated the present values of the expected yearly net revenues for each alternative over a 20-year period. A discount rate of 7.125 percent was used in this analysis. The present value of 20 years of net revenue under present management amounts to $54,570, whereas such revenues under intensive management amount to $64,920 (Table 4-13).

Medium-Size Ranch. Under *Intensive Grazing*, the herd size of the typical medium-size ranch would remain at 129 cows, and the ranch's income and expenses would not change. Long-term forage improvements, however, would allow the typical medium-size ranch to stock 148 cows, a 15 percent increase over the existing stocking level. Yearly net revenue under intensive grazing management would at first remain at $12,093, but over a 20-year period, yearly net revenue would gradually increase to $20,174 under projected increases in forage, calf crops, and calf weights (Table 4-6). The present value of 20 years of net revenue on the medium-size ranch under present grazing management amounts to $124,460, whereas such revenues under intensive grazing management amount to $158,610.

Large Ranch. Under *Intensive Grazing* management, the initial herd size of the typical large ranch would remain at its 5-year average licensed use — 460 cows. The large ranch's income and expenses would also not change. Long-term forage improvements, however, would allow the typical large ranch to stock 517 cows, a 12 percent increase over the existing level. Yearly net revenue would initially remain at $33,812. Long-term forage increases combined with increased calf crops and calf weights would increase yearly net revenue to $64,694 after 20 years. The present value of 20 years of net revenue on the large ranch under present grazing management amounts to $348,000, whereas such revenues under intensive grazing management amount to $478,480.

Ranch Finance

Ranch values are based on allowable grazing preference figures at an estimated value of $125 per AUM or $1,500 per animal unit (Durfee, 1981). The intensive grazing management alternative would reduce grazing preference to the ranch's 5-year average licensed use. The value of the typical small-ranch would decrease from $85,500 to $76,500 in the short term. Long-term AUM increases, however, would raise the typical small ranch value to $88,500. The value of the typical medium-size ranch in the EIS area would decrease from $229,500 to $207,000 in the short term, but long-term AUM increases would raise the value to $238,500. The value of the typical large ranch would decrease from $1,020,000 to $739,500 initially, but after 20 years, projected increases in grazing authorizations are expected to raise the value to $831,000.

The overal impact of *Intensive Grazing* on the rancher's ability to borrow money would vary from ranch to ranch. Generally, the reduced ranch values would adversely affect the asset base of the rancher, making it more difficult to borrow money. Long-term forage increases would improve the ranch's profitability and raise the value of the

ranch and might offset the rancher's reduced borrowing ability.

Regional Economics

Under intensive grazing management, total gross receipts from the sale of livestock for the 33 EIS area ranches would remain at $996,000 in the short term, and the ranches' contribution to the economic study area's total livestock sales would remain at 0.32 percent. In the long term, however, gradual AUM increases would increase livestock sales to $1,448,000 or 0.50 percent of the study area's livestock-related sales (Table 4-14). Ranch operating expenses for the 33 ranchers would remain at $497,000 in the short term and increase to $555,000 after 20 years. Net revenue would remain at $499,000, increasing to $893,000 after 20 years. Ranch labor requirements would remain at 23 workyears, increasing to 26 workyears after 20 years. Earnings from this employment would at first amount to $242,000 per year, increasing to $273,000 per year after 20 years.

Estimated annual construction earnings from new rangeland developments would amount to $131,000 per year for 5 years. This amount represents less than 1 percent of the yearly construction-related earnings in the economic study area.

Annual visitor use for big-game hunting in the planning area would increase by 800 visitor days per year after 20 years, increasing yearly recreational-related expenditure by $16,000 per year. These expenditures, however, are insignificant compared to the total for the study area.

Benefit-Cost Analysis

Using a discount rate of 7.125, economists conducted a benefit-cost analysis for each of 35 allotments proposed for intensive grazing management. (The Pipeline allotment has an existing AMP and no benefit-cost ratio was needed for this allotment.) The results of the analysis revealed that 9 allotments have benefit-cost ratios greater than 1:1, and 26 have ratios less than 1:1. The overall benefit-cost ratio for these 35 allotments amounted to 0.7:1.

Social Attitudes and Values

No significant social impacts would result from a decision to implement the *Intensive Grazing* alternative. Some groups and individuals within the area would voice approval or disapproval of any decision, but the area's social diversity would keep BLM decisions on the proposed alternatives from having significant social impacts.

SUMMARY

If implemented, *Intensive Grazing* would meet all or portions of the eight planning objectives listed in Chapter 1. Objectives for rangeland condition, livestock, forage production, wild burros, and protected plants would be met completely. Improved habitat might require more than 20 years to support reasonable numbers of big game. More than 10 years might be needed to reach satisfactory condition on 1 million acres of special status animal habitat. Objectives for restoring deteriorated riparian habitats would be met to the extent that intensive grazing management, habitat management plans, and measures for resource enhancement are effective in protecting woody plant species and increasing broadleaf reproduction.

Impacts of Seasonal Grazing Management (Seasonal Grazing)

VEGETATION

Seasonal Grazing would benefit vegetation by allowing 4.5 months of rest annually from June 1 to October 15 on 35 allotments under seasonal grazing management. Vegetation on 43 nonintensively managed allotments would undergo little change in 20 years.

Moderate utilization (40 to 60 percent) of key forage plants, better livestock distribution from new rangeland developments, and yearly rest of perennial forage during the critical growing season would increase vegetation production 4.5 percent from 490 million to 512 million pounds in the long term. The most rapid improvement would occur on high-response areas now showing an upward trend. Low-response areas would not greatly change in the long term.

Plant Cover

Overall, *Seasonal Grazing* would little affect plant cover 20 years after implementation (Table 4-1). Seasonal allotments, which would be rested each year from June 1 to October 15, would improve the most. The annual rest period would allow desirable forage to retain or improve its vigor and reproduction. As desirable key species increase, they would eventually replace the less desirable plants,

although the percentage of plant cover would not greatly increase.

No change in plant cover is predicted on the pinyon-juniper vegetation type, occupying less than 2,200 federal acres on seven nonintensive allotments. The greatest change would occur on 11,000 acres of riparian vegetation, which is the EIS area's most responsive vegetation type. Herbaceous vegetation would improve most rapidly under this alternative.

Rangeland Condition and Trend

Rangeland condition on 32 allotments now with stable or upward trends would improve under seasonal grazing management. Condition would most rapidly improve in high-resonse areas, but improvement may not be significant in areas already showing satisfactory condition. Declining trends on three allotments would either stabilize or reverse as yearly rest is provided for 4.5 months. The rest would allow key plants to recuperate from use received earlier in the season. Newly constructed rangeland developments on seasonal allotments would also benefit vegetation by improving livestock distribution.

Intensive management of the Pipeline allotment would continue to improve rangeland condition.

Except for seven ephemeral allotments, no rest is proposed for the nonintensive allotments where rangeland condition is projected to follow current trends in the short term. Ten allotments would continue to improve, 25 allotments are expected to remain stable, and 7 allotments would continue to deteriorate except where mitigation or monitoring leads to reduced grazing pressure or improved grazing management. Currently deteriorating allotments would receive priority monitoring, and livestock numbers would be adjusted where needed to prevent damage to public lands. No data exist for the White Tanks allotment.

Areas in excellent condition would increase from 26,400 to 133,400 acres, and areas in good condition would increase from 412,500 to 488,100 acres. Fair condition rangeland would decrease from 713,600 to 572,100 acres, and poor condition rangeland would decrease from 222,300 to 181,100 acres (Table 4-2). Improvement rates would depend on the current health of the vegetation and future variations in climate. Utilization of key forage plants would be limited to an average of 40 to 60 percent of the current year's growth. During years of abundant precipitation, however, when ephemeral vegetation becomes abundant, additional livestock may be allowed to graze to make use of the ephemeral bloom. Rangeland condition would not be greatly affected during the ephemeral bloom because livestock tend to relish actively growing annual plants. Before ephemerals have cured or dried out, livestock numbers would be adjusted or livestock removed.

As rangeland condition improves on seasonal allotments, plant composition would also change. As rangeland improves to a higher condition class, key species composition would increase. Table 4-3 shows increases in key species composition as rangeland improves to a higher condition class. Appendix 6 shows projected long-term impacts to rangeland condition.

Riparian Vegetation

Riparian vegetation would improve under *Seasonal Grazing* . Resting riparian areas 4.5 months each year combined with lower utilization, exclosures, designating areas of critical environmental concern (ACECs), and activity plan implementation (see items 19 and 20 under Measures for Resource Protection and Enhancement, Chapter 2) would increase plant production and vigor. Herbaceous vegetation would improve most rapidly, and woody species would improve in the long term to the extent that activity plans and protective measures are effective in curtailing high utilization of young seedlings.

Riparian plant cover would slightly increase from 52 to 55 percent (Table 4-1) under this alternative, mainly in broadleaf riparian habitat where protective measures would be concentrated. Riparian areas in excellent condition would increase from 840 to 1,900 acres; good condition riparian areas would decrease from 5,070 to 4,440 acres; fair condition riparian areas would decrease from 3,940 to 3,740 acres; and poor condition riparian areas would decrease from 1,230 to 1,000 acres. Key species composition of riparian species would improve as riparian areas improve to the next highest condition class (Table 4-3).

Without special measures to protect riparian resources rangeland condition in riparian areas would little improve. For some critical riparian areas, excluding grazing animals would be the only certain way to assure protection (Moore and others, 1979).

Protected Plants

Seasonal Grazing would benefit protected plants through yearly rest from livestock grazing from June 1 to October 15 and moderate key species utilization (40 to 60 percent). Three protected species are impacted by grazing animals. *Mammillaria viridiflora* is found in the chaparral vegetation type. Although not directly grazed by livestock, it needs perennial grass for protection and moisture (Butterwick, 1981). Populations in the Harquahala and Harcuvar Mountains, which would be under seasonal grazing management, would improve due to reduced trampling and improved perennial grass species and a fenced exclosure in the Harquahala Mountains. Populations in the Weaver and Black Mountains would continue to be

Proper Utilization of Plants Is Important

Proper utilization of forage plants is an important part of rangeland management. Big galleta, a common perennial grass in the EIS area, is shown ungrazed on the left and heavily grazed on the right. BLM proposed to adjust grazing levels to reach a moderate utilization that encourages plant vigor and reproduction.

affected by yearlong grazing on nonintensive allotments. *Juncus articulatus* and *Thelypteris puberula* var. *sonorensis* are riparian species that would improve under this alternative as a result of special measures applied to riparian areas, including exclosures, lower utilization, ACEC designation, and habitat management plan implementation.

Ephemeral Option

The ephemeral option would have the same impacts as the *Seasonal Grazing* alternative on all allotments except the eight proposed for ephemeral designation and management: Calhoun, Carter Herrera, Douglas, Effus, Flat Iron, Jones, Saddle Mountain, and Sitgreaves Red Hill. Grazing privileges would be canceled and livestock would be allowed to graze only during periods of abundant ephemeral growth. The additional rest from grazing livestock on these eight allotments would increase overall vegetation production (Table 2-5).

Under the ephemeral option four allotments with an apparent stable trend (Carter Herrera, Flat Iron, Saddle Mountain, Sitgreaves Red Hill) would not greatly change because of low rainfall and low potential for perennial forage production. One allotment with an apparent upward trend (Douglas), would not significantly improve for the same reasons.

Calhoun, Jones, and Effus allotments are proposed for ephemeral grazing because of low production and unsatisfactory rangeland condition and trend. The ephemeral option would improve condition on these allotments to an unknown extent. Effus and Jones are declining in rangeland condition and should stabilize or slightly improve in the long term. Calhoun, in an apparent stable trend, would also somewhat improve in the long term. These allotments occur in slightly higher rainfall zones with high-response range sites having a higher potential for vegetation production.

Under the ephemeral option, impacts to riparian vegetation and protected plants would be the same as under *Seasonal Grazing*.

SOILS

Erosion and Productivity

Soil erosion on 35 seasonally grazed allotments and the intensively managed Pipeline allotment would decrease, mainly due to moderate utilization, improved livestock distribution, and rest built into the grazing system. These projections reflect professional judgement based on rangeland inventory data and projected impacts to vegetation. In riparian areas, soils in a moderate or severe erosion condition would improve, since habitat management plans and seasonal grazing would provide rest and allow recovery of vegetation. Impacts to soils under the ephemeral option would differ little from impacts under the *Seasonal Grazing* alternative.

Soil Compaction

The effects of different types of grazing management on soil compaction are shown in Table 4-4. Soil compaction is expected to increase around new spring developments and well sites, but the acreage impacted would be small and insignificant.

Construction of rangeland developments under *Seasonal Grazing* would temporarily disturb 34 acres of soil and permanently occupy 10 acres. The plants and soils disturbed would need 3 to 10 years to recover (BLM, 1978). The major impact to the soil would be the 10 acres permanently lost to rangeland developments, but this acreage is insignificant when compared to the total EIS area (Table 4-5).

Sediment Yield

Sediment yield would decrease due to increased effective ground cover and decreased livestock grazing and upland erosion. Moderate sediment yields (0.5-1.0 acre-feet/square mile/year) would decrease to a slight rating after 20 years. Effective placement of water developments, yearly rest, and lower burro numbers would reduce sediment yields in riparian areas by reducing grazing pressure.

WATER RESOURCES

Water Quantity

Assuming that long-term forage increases of 6,300 AUMs under *Seasonal Grazing* (or the ephemeral option) would lead to increased grazing, maximum water consumption by grazing animals could increase from 63 to 69 acre-feet. New livestock waters consisting of 23 wells and 7 spring developments would not significantly affect ground water or change the amount of surface water storage.

Decreased surface water yields would result on 35 seasonally managed allotments because of increased infiltration and greater soil moisture deficits caused by increased vegetation. Surface water yields on most nonintensive allotments would not measurably change.

Watershed cover would not be significantly affected except in riparian zones where increased herbaceous vegetation would rapidly improve watershed protection.

Water Quality

As *Seasonal Grazing* improves livestock distribution, reduces grazing pressure in overgrazed areas, and increases vegetation, water quality would slightly improve. High sediment and coliform rates would still follow intense summer thundershowers and long winter storms. Surface water quality in riparian areas would benefit from increased rest, lower utilization, increased streambank cover, and fenced exclosures. Ground water quality would be unaffected.

LIVESTOCK GRAZING

Adjustments in Numbers

Under *Seasonal Grazing*, the initial livestock stocking levels would be the same as under the *Proposed Action*. Livestock numbers would be reduced 16 percent from authorized grazing preference and increased by 7 percent from the past 5-year (1976-1980) average licensed use.

Licensed use on small ranches in the EIS area would be reduced by an average of 11 percent from authorized grazing preference. All small ranches except Orosco would be adjusted to the past 5-year average use level. Increases in forage production 20 years after implementation would

Exclosures Help Evaluate Grazing Impacts on Rangelands

Fenced exclosures document the effects of grazing from livestock, wild burros and wildlife on rangeland plants. This exclosure shows the contrast between a heavily grazed area on the right and one protected from grazing for 15 to 20 years on the left. Inside the exclosure are perennial grasses and forbs, such as big galleta, bush muhly, and globemallow. Outside the exclosure these species occur much less frequently.

allow stocking levels on small ranches to increase to an average of 16 percent above the 5-year average licensed use or 3 percent below authorized grazing preference.

Medium-size ranches would initially be reduced by an average of 10 percent from the authorized grazing preference. Two allotments, Leidig and Loma Linda, would keep their authorized grazing preference, and all other medium-size ranches would be adjusted to the past 5-year average use. Twenty years after implementation, increases in forage production would allow stocking levels to increase to an average of 4 percent below authorized grazing preference.

Initial adjustments would reduce livestock numbers on large ranches by an average of 24 percent from authorized grazing preference, and all allotments except Lamberson would be adjusted to the past 5-year average licensed use. Lamberson would keep its authorized grazing preference. Forage increases over a 20-year period after implementation would permit average stocking levels on large ranches to increase to 11 percent above the 5-year average licensed use, and within 17 percent of authorized grazing preference.

The ephemeral option of the seasonal alternative would cancel grazing preference on eight perennial-ephemeral allotments (Table 2-10).

Table 3-5 groups allotments by ranch size. Appendix 4 shows initial and projected allocation by allotment.

Ranch Operations

The *Seasonal Grazing* alternative would place under seasonal grazing 35 existing perennial-ephemeral allotments, involving 32 operators. These allotments would generally shift from continuous or sporadic grazing to a 7.5-month season-of-use from October 15 to June 1. Seasonal grazing would require ranchers to remove their livestock from public land during the critical plant growth period and force them either to use nonpublic lands during this period or to change from cow-calf to steer operations. Because the EIS area is dominated by federal lands, state and private lands are not likely to be capable of fully accepting the additional grazing pressure of cow-calf operations. Seven of the 35 perennial-ephemeral allotments support steer operations and would not be greatly affected.

Resting plants during their critical growth season would increase key forage species production and improve vigor, improving the quality and increasing the quantity of

forage for livestock grazing. The proposed water developments would also improve livestock distribution within allotments.

Under *Seasonal Grazing*, 1 allotment would remain under intensive management, and 43 allotments would remain under nonintensive management. Under the ephemeral option of the seasonal alternative, management would remain the same as under *Seasonal Grazing* except that eight perennial-ephemeral allotments would have their preference canceled and would become ephemeral allotments. Grazing would be allowed only in years of good ephemeral growth and only as long as the ephemerals are in good supply. Perennial vegetation would benefit from light use, but ranching operations would drastically change. The number of livestock allowed to graze on public land would depend on weather, and this dependence would make operations unstable. In some years no livestock would be allowed.

Livestock Performance

Under *Seasonal Grazing* cow-calf operations would generally change to steer operations. The proposed new waters would better distribute livestock. Better livestock distribution, combined with rest during the critical growth period of forage, would allow the more desirable forage species to increase. Over time, these conditions would cause increased weight gains and reduced death losses in livestock.

The ephemeral option would not include additional waters for better livestock distribution. It would allow for only light use of perennial forage, since livestock would be allowed on the public rangeland only when adequate ephemeral forage is probable. Livestock would benefit from the improved rangeland condition and from being on the rangeland only when ephemeral forage is abundant. Increased weight gains and reduced death loss would result.

Livestock performance would not sharply change on existing ephemeral or intensively managed allotments or on nonintensive allotments with stable trends in rangeland condition. In the long term, livestock performance would drop on nonintensive allotments with downward trends unless monitoring and mitigation lead to actions that stabilize or reverse the trends. BLM proposes to intensively monitor these allotments to determine what changes are needed in livestock numbers or management to restore satisfactory conditions and improve livestock performance.

Monitoring

If future monitoring studies show a large, sustained increase in perennial forage on any allotment classified ephemeral under the ephemeral option, BLM could grant an authorized grazing preference.

WILDLIFE

This section analyzes the impacts of *Seasonal Grazing* on wildlife habitat components — food, water, cover, and space. Table 4-17 rates the impacts of *Seasonal Grazing* on wildlife and its habitat. The analysis addressed specific impacts to wildlife and habitat on public lands only.

Introduction

Most significant impacts would not occur in the short term but would begin to be evident in the very long term (beyond 20 years) as vegetation changes (Figure 2-1). Vegetation would significantly change on 37 allotments over 1,095,000 acres of public land, but 298,000 acres would remain relatively unchanged.

Seasonal management would (1) provide for intensive monitoring of forage to eventually improve rangeland condition and forage availability, and (2) supply 4.5 months of rest from livestock grazing every year. Rest would temporarily increase forage and cover for wildlife in some areas and increase cover and production of warm-season grasses and forbs important to wildlife.

Nonintensive grazing management on 36 allotments would allow year-long grazing and require no rest treatments. Wildlife habitat would generally continue to improve or decline along present trends. Declining or stable allotments would measurably improve only where effective habitat management plans are implemented to ensure needed rest or where monitoring and mitigation lead to reduced grazing pressure or improved grazing management.

Ephemeral grazing management on seven allotments would benefit perennial vegetation. In most years the land would be rested from livestock grazing from June through January. Conflicts with the desert tortoises are not expected to be significant, since most crucial desert tortoise habitat lies outside ephemeral allotments. Potential conflicts near the Buckskin Mountains could be partially mitigated by measures for resource protection described in Chapter 2. Rest treatments would otherwise impact wildlife in the same manner as seasonal management, but benefits would be greater due to more frequent rest.

Seasonal grazing management calls for several water developments, which would permanently remove 10 acres of habitat from production.

Thirty water developments are proposed for the seasonally managed allotments (Table 2-6), and all are expected to provide year-round water. Heavy forage utilization, trampling, and trailing in an average 750-foot radius from the new waters would greatly deteriorate vegetation on 1,200 acres, forming disturbed areas.

Increased water availability should benefit several species, as water is a primary limiting factor to habitat quality in much of the desert covering 70 percent of the planning

TABLE 4-17
WILDLIFE AND HABITAT IMPACT RATINGS UNDER SEASONAL GRAZING[1]

Alternative's Features	Big Game				Special Status Species				
	Mule Deer	Bighorn Sheep	Pronghorn Antelope	Javelina	Federal-Listed Threatened/ Endangered Species	Other Protected Species[2]	Upland and Small Game	Nongame Wildlife	Riparian Habitats
Grazing Use									
Vegetation Production Available Initially	2	4	2	4	2	2	3	2	1
Vegetation Production Available in 5 Years	3	4	2	4	2	3	3	3	3
Vegetation Production Available in 20 Years	4	4	3	4	4	4	4	4	4
Levels of Grazing Management									
Intensive	4	NA	NA	4	3	3	3	3	NA
Seasonal	4	4	3	3	4	4	4	4	5
Nonintensive	2	3	3	3	3	2	3	2	2
Ephemeral[3]	(4)	(3)	NA	(3)	(4)	(4)	(4)	(4)	(4)
Management Facilities									
Water Developments	3	3	3	2	NA	3	3	3	NA
Fencing	3	3	2	3	NA	NA	NA	NA	NA
Totals (Average)	3.1 (3.2)	3.6 (3.6)	2.4 (2.4)	3.4 (3.4)	2.8 (3.0)	3.0 (3.1)	3.3 (3.4)	3.0 (3.1)	3.0 (3.1)
Average Rating for Alternative 3.1 (3.2)					Average Rating for Existing Situation 2.5				

[1] Rating system: 1 = most significant adverse impact; 2 = adverse impact; 3 = minor or no impact; 4 = beneficial impact; 5 = most significant beneficial impact; NA = not applicable.
[2] Proposed threatened or endangered species, state-listed species, BLM sensitive species.
[3] Ephemeral option figures in parentheses.

area. The increase in water, however, would also increase competition for some species.

Big Game

Mule Deer

The vegetation productivity of mule deer habitat would increase forage carrying capacity by 5 percent. The following allotments would improve the most: Aguila, Babcock, Carco, Coughlin, Loma Linda, Orosco, Santa Maria, Sky Arrow, and Wickenburg. Competition for forage and space would decline in the long term as nearly 260,000 acres of deer habitat improve to good and excellent rangeland condition. Over 1,095,000 acres of mule deer habitat in 37 allotments would be rested yearly, providing plenty of forage for deer for 4.5 months per allotment.

New waters in mule deer habitat would benefit deer by expanding their ability to forage in new areas. On the other hand, 30 water developments would greatly extend the range of livestock into areas that have previously been only lightly grazed. As a result, livestock-deer competition for browse and space would seasonally increase, and cover would temporarily decrease.

Pronghorn Antelope

Potential pronghorn habitat would not be significantly affected under the *Seasonal Grazing* alternative.

Desert Bighorn Sheep

The forage productivity of desert bighorn habitat would slightly increase in the long term, but competition from livestock and burros would decrease to allow for an 80 percent increase in bighorn forage carrying capacity over the long term. Over 69,000 acres would improve to good and excellent condition, allowing bighorn to use more of the

Aguila, Hancock, and Leidig allotments. Increased forage would make the foothills more usable by bighorn.

Desert bighorn sheep would also benefit from rested allotments less than other big game because of the limited distribution of bighorn. Like deer, bighorn sheep are creatures of habitat that are reluctant to move into new areas. Thus, they may not fully take advantage of seasonally rested allotments. Desert bighorn sheep would benefit from additional waters and the separating of existing waters to segregate wildlife and livestock use.

Javelina

Seasonal Grazing would benefit javelina in several ways. Javelina would continue to increase in numbers and become better distributed throughout the EIS area, and reduced forage competition among all users would allow even greater long-term javelina increases. Javelina would seasonally benefit by using rested areas in the short term. They would also benefit from the long-term increase in production expected under seasonal treatments. Finally, increased water availability would increase the size of javelina foraging areas.

Waterfowl and Shorebirds

Although livestock grazing would reduce woody plant cover, long-term increases in grass and forb cover (Table 4-1) would partially offset continued livestock disturbance in 50 percent of the riparian habitat and at water sources (Hughes, 1978). The overall change would be toward slightly deteriorated waterfowl and shorebird habitat.

Each additional water development would directly benefit waterfowl and shorebirds by providing more stopover sites during migration and wintering or breeding sites at the larger developments.

Upland and Small Game

The productivity of upland and small-game habitat would increase by 5 percent in the long term. Gambel's quail populations would fluctuate less than at present, and populations during high rainfall years could be higher than at present. Upland and small game would take advantage of periodically ungrazed habitat. Rest from grazing would lessen competition for food and space in the short term and increase needed cover in the long term. Grazing treatments would not significantly affect while-winged doves, but protecting 3,200 acres of riparian vegetation (28 percent of the 11,100 acres) would improve white-winged dove habitat Desert cottontail and jackrabbit populations would probably not greatly change.

Upland and small game would benefit from additional waters with surrounding exclosures. The relationship of protected area, disturbed area, and surrounding habitat would create edges or ecotones (Leopold, 1933), which could also benefit game (Dick-Peddie, 1976; Thomas, Maser, and Rodiek, 1978).

Nongame Wildlife

Under *Seasonal Grazing*, increased plant cover on 182,000 acres (13 percent of the area) and decreased competition among perennial forage users would mainly effect the lower layers of vegetation needed for cover by many nongame species. Habitat with improved overall ground cover would increase by 42 percent, but 753,000 acres in the EIS area would still lack sufficient ground cover. Nongame would temporarily benefit on 37 allotments during rest periods when cover would be more abundant than during grazing and when forage competition would be reduced.

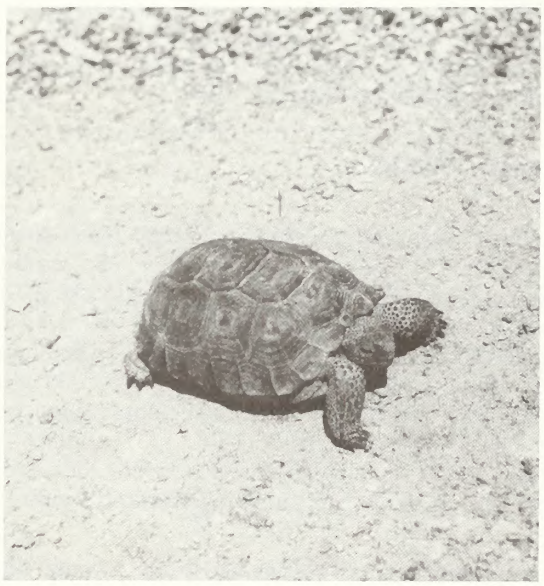
Approximately 30 nongame species would directly benefit from additional livestock waters (Elder, 1953; Wright, 1959). Nongame habitat in the 1,200 acres of disturbed areas would be severly impacted due to reduced plant cover and increased soil compaction (Busack and Bury, 1974).

Protected and Sensitive Wildlife

Aquatic and riparian bald eagle winter habitat would remain deteriorated in the short term but would improve in the very long term. Eagles would find fewer roost trees in the short term as decadent trees die out without replacement. More potential roost trees, however, would develop in the very long term. Aquatic habitat would not significantly change due to changes in livestock grazing alone. At least 3,200 acres (half of the total) of riparian bald eagle habitat would improve in the very long term.

Potential peregrine falcon habitat would react the same as would bald eagle habitat and would be likely to support peregrine use in the long term.

In the long term, 68,800 acres of tortoise habitat would improve, and the quality of 41,000 acres would remain static or decline. In the short term, tortoises and other forage users would compete less for winter-spring annuals on 68,800 acres. In the long term, perennial herbaceous forage would increase with decreased competition for forage. On the remaining 41,000 acres, livestock grazing of ephemeral growth could decrease forage during winter and spring seasons as many as 8 years out of 10, creating an artificial drought and causing the tortoise to lose weight and experience lowered reproduction (Berry, 1978). Since production of ephemeral forage is not dependable, further human manipulation could disrupt wildlife dependent on such forage.



Desert Tortoise Populations Decline

Desert tortoises may live 100 years, but populations are declining in the Southwest. Collection, shooting, and heavy competition for ephemeral forage have contributed to the declines. Some grazing alternatives would provide increased forage for the tortoise and protect crucial desert tortoise habitat.

Seasonal Grazing would have the following impacts on other protected or sensitive wildlife.

• Water developments in desert tortoise habitat would concentrate livestock and increase forage competition and deaths due to trampling.

• Black hawk nesting habitat would improve over at least 3,200 acres in the very long term as the number of nesting trees increases. In the short term, black hawk numbers would not greatly change. Nesting habitat, however, would slightly decline as dead trees are not immediately replaced.

• Zone-tailed hawk habitat would change little in the long term. Rest periods would indirectly benefit zone-tails by slightly increasing their prey base.

• Great egrets, snowy egrets, and black-crowned night herons would continue to use denuded areas around stock tanks, Alamo Lake, and sections of the Bill Williams, Santa Maria, Hassayampa and Big Sandy Rivers as stopovers during migration. These birds, however, would probably not breed in the EIS area because cover would be lacking. They also would not directly benefit from proposed grazing treatments.

• Gilbert's skink habitat would improve in the long term, primarily due to a 4 percent increase in plant cover. Rest periods would help increase ground cover and possibly increase prey.

• The quality of Gila monster habitat would improve, primarily due to increases in prey base. Prey would increase as a result of periodic rest from grazing and an increase in plant cover in preferred habitat.

• Sonoran mountain kingsnake habitat would not improve, since plant cover and prey levels would remain unchanged on 2,100 acres of nonintensively managed habitat.

• Ferruginous hawk habitat would remain unchanged on the nonintensively managed 2,600 acres of grassland habitat.

• Sharp-shinned and Cooper's hawk habitat in riparian areas would improve on 430 acres. The remaining 32,900 acres of nonintensively managed habitat would change little in the long term. Periods of rest from livestock grazing during the nesting season would slightly improve nesting success (Millsap, 1981).

• Prairie falcon foraging habitat would slightly decline as 176,000 acres of habitat improve to fair and good rangeland condition in creosotebush and paloverde habitat.

Riparian Habitat

In the short term, the quality of riparian habitat would continue to gradually decline along present trends. In the long term, however, broadleaf trees would replace older decadent trees on 1,400 acres or about 66 percent of the broadleaf riparian habitat. On the remaining 34 percent of habitat not proposed for seasonal management (700 acres), young cottonwood, willow, and ash trees would not become established to replace older trees without effective controls on grazing animals (BLM, 1979c; Hughes 1978). Habitat quality in these areas would decline through the long term unless measures are implemented to protect woody plant species and ensure broadleaf reproduction. On the 1,400 acres under seasonal management, rest periods would be tailored to allow the several years needed for seedlings of favored woody plants — cottonwood, Goodding willow, and velvet ash (Martin, 1979) — to grow to height beyond the reach of livestock (BLM, 1979c). Under seasonal grazing management and habitat management plans, all 2,100 acres of broadleaf riparian habitat would improve to an unknown extent in the very long term.

Water developments would impact riparian habitat in varying ways, depending on their location. Waters within 2 miles of riparian habitat would not improve riparian quality,

since they would not effectively draw livestock from riparian corridors. On the other hand, waters beyond 3 miles from riparian areas would attract livestock into other foraging lands and in the long term slacken cattle grazing in the riparian corridor. Data, however, are lacking on the extent of the problem and the amount of improvement attainable. Improving water distribution alone would not greatly improve the quality of riparian habitat.

The 9,000 acres of mesquite washes making up the rest of the riparian habitat would not significantly change in the long term.

Ephemeral Option

Under the ephemeral option, eight allotments, involving 200,600 acres of habitat, would be changed from yearlong to ephemeral grazing. The most significant changes would occur on Effus, Jones, and Calhoun allotments. Combined, these allotments have 16,000 acres of bighorn habitat, 7,400 acres of desert tortoise habitat, and 80 acres of riparian habitat, which would improve faster under the ephemeral option than under seasonal management because of increased rest and decreased grazing pressure.

Under the ephemeral option, all perennial forage could be grazed by mule deer and javelina. Moreover, this option would allow immediate short-term improvement and faster long-term improvement in habitat condition than would *Seasonal Grazing*.

WILD BURROS

Seasonal Grazing would have the same impacts on burros as would the *Proposed Action* except that no intensive grazing system would be implemented on the Santa Maria allotment. Thus, new fences would not be built, which could inhibit free burro movement.

Seasonal Grazing would eliminate burro use from three use areas (12 allotments) and reduce the Alamo herd from 300 to 200. Vegetation and crucial wildlife habitat in the burro use areas would benefit from the reduced competition for 2,400 AUMs of forage and 2.2 acre-feet of water now used by burros. In addition, removing burros from the Little Harquahala Mountains would alleviate management problems of trespass burros in the farmland and subdivisions around Salome. A well-managed herd in the Alamo HMA along with interpretive signing would provide opportunities for public viewing and enjoyment.

Seasonal Grazing would lead to the following adverse impacts.

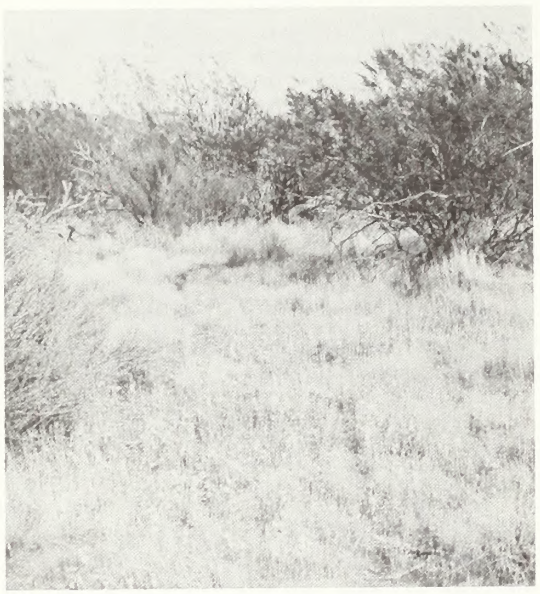
- The removal program would cause temporary stress in the animals removed or disturbed in the chase, including wildlife and livestock.
- Eliminating burros from the Harquahala-Big Horn Mountains would remove a genepool source of red burros and white burros, which are rare in Arizona. From 10 to 15 red or white burros are believed to exist in this area.
- Protecting the riparian habitat along the Bill Williams and Santa Maria Rivers for wildlife habitat through fencing and other management actions could locally inhibit burro access to stretches of water and the river bottom forage — bermuda grass, mesquite leaves, and mesquite beans.
- As many as 30 burros would remain in the Bar D 4 and Ekvall allotments at the east end of the Alamo HMA and would adversely impact protected plant areas, raptor areas, and proposals for bighorn reintroductions. Wild burros intermittently using solidly blocked nonfederal lands in these allotments would continue to cause problems for the state and for private land owners.
- Continued burro use of the area around Alamo Lake administered by the Corps of Engineers would interfere with land and resource management by the Corps, the Arizona Game and Fish Department (AG&FD), and the Arizona State Parks Department. Burro requirements for forage and water from the area conflict with AG&FD plans to fence the lake and create waterfowl habitat by planting small-grain crops in the river bottom and at the headwaters of the lake.
- Creating and managing the Alamo HMA with a herd of 200 burros would affect eight grazing allotments and require the annual commitment of 1,200 AUMs of forage and 1.1 acre-feet of water. Further costs would accrue from the monitoring and management of the herd and from the removal of 75 animals every 3 years to maintain the population level.

The ephemeral option would impact wild burros in the same manner as would the *Seasonal Grazing* alternative.

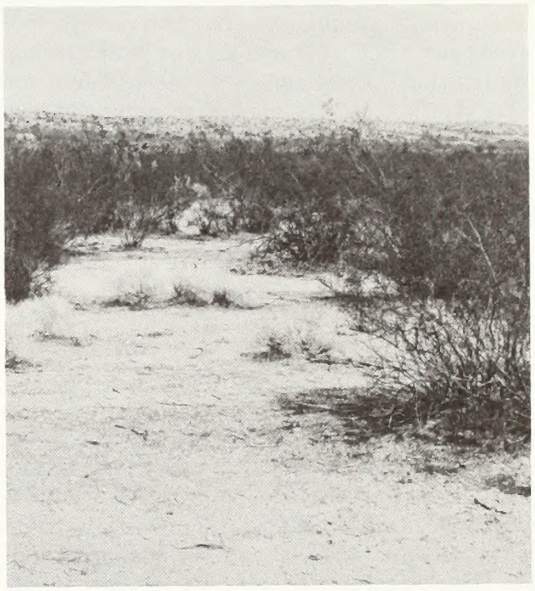
CULTURAL RESOURCES

Seasonal Grazing would slightly increase impacts to cultural resources (Table 4-8). Building new rangeland developments could destroy undiscovered sites. In addition, vandalism would increase from greater use of and access to rangeland facilities. Since initial stocking rates would be determined by average licensed use from 1976 to 1980 — a 16 percent reduction from the authorized grazing preference — livestock grazing impacts could slightly decrease in the short term. Removing livestock from June 1 to October 15 could also slightly decrease livestock grazing impacts.

Ephemeral management of eight more allotments under the ephemeral option could slightly reduce adverse impacts by reducing livestock grazing pressure and trampling of sites.



Ephemeral forage is abundant.



Ephemeral forage is absent.

Ephemeral Vegetation Plays Important Role in Desert Rangelands

Much of the EIS area's forage production comes with annual grasses and wildflowers responding to infrequent heavy rains in late winter or early spring. Such forage is called ephemeral. A large amount of ephemeral forage may occur as rarely as 3 or 4 years out of 10. Some livestock operations depend heavily on ephemeral vegetation, and many wildlife species rely on it for food and cover.

RECREATION

Seasonal grazing management would measurably impact only hunting. Big-game (deer and javelina only) populations could increase by 940 animals, increasing annual big-game hunting by 600 visitor days. Changes in small and upland game could increase or decrease hunter use visitor days, although these changes cannot be estimated with accuracy. Increases in game would slightly increase opportunities for viewing wildlife. See Tables 4-10 and 4-11.

VISUAL RESOURCES

Increases in vegetation under *Seasonal Grazing* could gradually change the color and texture of the landscape. Change would be most evident along roads. Short-term and highly localized visual contrasts would result from rangeland developments. Contrast ratings will be completed for all rangeland developments to ensure that recommended visual resource management class objectives are met. For criteria and methodology, see BLM Manual, Section 8400.

WILDERNESS VALUES

On lands in the EIS area that are established as wilderness study areas, all rangeland management will comply with BLM's *Interim Management Policy and Guidelines for Lands under Wilderness Review* (BLM, 1979b). No impacts are expected on wilderness values.

ECONOMIC AND SOCIAL CONDITIONS

Economic Conditions

This section describes the economic impacts to the EIS area ranchers and the community from the *Seasonal Grazing* alternative, including impacts from expected changes in construction income and recreation use. Impacts to these operators are analyzed through the use of three ranch budgets representing typical cow-calf operations and three ranch budgets representing typical seasonal grazing operations.

This seasonal ranch budgets show the expected receipts, operating costs, and net revenue for three seasonal yearling ranch operations. The amount of net revenue earned by seasonal yearling operations would be expected to fluctuate (at times greatly) as calf and yearling prices fluctuate. Moreover, the difference between the price of calves at the time of purchase and the price of yearlings at the time of sale is an important determinant of the amount of net revenue earned by seasonal operations.

The seasonal ranch budgets were prepared using an average calf price for the 1976-78 period and an average yearling price for the 1977-79 period. Different yearly price averages were used because seasonal operations typically purchase calves in October and sell yearlings in June.

Ranch Budgets

Small Ranch. Under *Seasonal Grazing*, the typical small ranch would be changed from a cow-calf operation running 48 cows to a seasonal steer operation running 83 steers for 7.5 months. The typical small ranch could stock steers at a level equal to the ranch's past 5-year average licensed use. Long-term forage improvements, however, would allow the typical small ranch to stock 91 steers, a 9 percent increase over the short-term stocking level.

Yearly net revenue on the typical small ranch would increase from $5,302 to $6,949 after the change from a cow-calf to a steer operation. Long-term increases in forage would increase yearly net revenue on the steer operation to $7,618. The present value of 20 years of net revenue under present management amounts to $54,570, whereas the present value of such revenues under seasonal grazing management amounts to $73,270 (Table 4-13).

Medium-Size Ranch. Under the seasonal grazing alternative, the typical medium-size ranch stocking 129 cows would change to a steer operation running 221 steers for 7.5 months. Long-term forage improvement would allow the typical medium-size ranch to stock 236 steers, an increase of 7 percent. Yearly net revenues on the typical medium-sized ranch would increase from $12,093 to $18,502 after changing from a cow-calf to a steer operation. Long-term forage increases would increase yearly net revenue on this steer operation to $19,758. The present value of 20 years of net revenue under present management amounts to $124,460, whereas the present value of such revenues under seasonal grazing management amounts to $195,400 (Table 4-13).

Large Ranch. Under the seasonal grazing alternative, the typical large ranch stocking 460 cows would change to a steer operation and be allowed to stock 789 steers for 7.5 months. Long-term forage improvements, however, would allow the typical large ranch to stock 860 steers for 7.5 months, a 9 percent increase. Yearly net revenue on the typical large ranch would increase from $33,812 to $66,055 after changing from a cow-calf to a steer operation. Long-term forage increases would increase yearly net revenue on this steer operation to $71,999 after 20 years. The present value of 20 years of net revenue under present management amounts to $348,000, whereas the present value of such revenue under seasonal grazing mangement amounts to $702,980 (Table 4-13).

Ranch Finance

Seasonal Grazing would suspend authorized grazing preference above a ranch's 5-year average licensed use. The value of the typical small ranch would initially decrease from $85,500 to $76,500 but would rise to $85,500 in the long term as forage production and AUMs increase. The value of the typical medium-size ranch would initially decrease from $229,500 to $207,000, but long-term AUM increases would raise the value to $220,500. And the value of the typical large ranch would initially decrease from $1,020,000 to $739,500, but long-term AUM increases would raise the average value to $807,000.

The impact on ranch values of a ranch's change from yearlong to seasonal status is unknown. The typical ranch budgets reveal that all three ranch sizes would be more profitable under a seasonal operation, and increased profits would make it easier for ranches to borrow money and repay existing loans. Reductions in ranch values from decreases in authorized AUMs, however, would reduce the rancher's total assets, possibly making it more difficult for the rancher to borrow long-term capital. Increased profits combined with decreased ranch values might offset each other and not change the rancher's ability to borrow.

Regional Economics

For comparing alternatives, total gross receipts under *Seasonal Grazing* will be viewed as the total value of beef produced by the 33 affected EIS area ranches. Actual gross receipts would normally reflect the total value of cattle sold,

but for steer operations the steers must be purchased as a cash expense. In this analysis the purchase price has been subtracted from the sales revenue to yield the value of beef produced. Ranch operating expenses do not include the purchase of steers, so that expenses can be compared with those of other EIS alternatives.

Under *Seasonal Grazing*, the adjusted gross receipts from the sale of livestock from the 33 EIS area ranches would increase from $966,000 to $1,743,000 after seasonal grazing is implemented. After 20 years, long-term forage increases would raise gross receipts to $1,893,000. The ranchers' contribution to the economic study area's livestock sales would increase from 0.32 percent to 0.60 percent in the short term.

Ranch operating expenses for the 33 ranches would increase from $497,000 to $866,000 in the short term. Long-term increases in the number of yearlings stocked would increase operating expenses to $941,000 after 20 years. Net revenue for the 33 ranchers would increase from $499,000 to $877,000 in the short term. After 20 years, net revenue for the 33 ranchers would amount to $952,000. Ranch labor requirements would decrease from 23 to 15 workyears in the short term, and in the long term would increase to 16 workyears. Earnings from this employment would decrease from $242,000 per year to $158,000 in the short term. Long-term labor requirements would provide earnings of $168,000 from the 33 EIS-area ranches.

Estimated construction earnings from new rangeland developments would amount to $37,000 per year for 5 years. This amount represents less than 1 percent of the yearly construction-related earnings in the economic study area.

Annual big-game hunting in the EIS area would increase by 600 visitor days per year after 20 years. Recreation-related spending would increase by $12,000 per year. These expenditures, however, are insignificant when viewed on a regional level.

Benefit-Cost Analysis

A benefit-cost analysis was conducted for the 35 allotments proposed for seasonal grazing management. Economists estimated the benefits and costs by allotment, using a discount rate of 7.125 percent. The results of the analysis revealed that benefit-cost ratios for 20 allotments exceeded 1:1. The remaining 15 allotments proposed for seasonal management did not have benefit-cost ratios greater than 1:1, and no rangeland improvements were proposed for these allotments. The overall benefit-cost ratio for the 20 allotments with ratios greater than 1:1 amounted to 1.2:1.

Ephemeral Option

Under the ephemeral option, 25 of the 33 ranches that would be affected by the proposed alternatives would be allowed to graze seasonally. Economic impacts would be the same as those discussed for the *Seasonal Grazing* alternative. The remaining eight allotments would be designated ephemeral and could be grazed only when BLM determines that ephemeral forage is adequate.

The economic impacts of changing yearlong to ephemeral management on eight allotments would highly depend on the individual ranch. Annual net revenue would greatly vary from year to year. Ranches would suffer in changing from a somewhat dependable income source to an ephemeral situation where yearly income is undependable. Thus, ranchers now living off their operations would probably need outside income to support their families.

Authorized grazing preferences on the eight allotments would be canceled. Since ranch values are partially based on preference as determined by BLM, the value of ranches losing preference would greatly decline. The extent of impact to each ranch, however, is unknown. Ranchers might find borrowing long-term and operating capital more difficult because of the decline in value of their total assets. Moreover, ephemeral operations involve more risk than do yearlong operations.

The economy of the study area would not be affected beyond the impacts discussed for *Seasonal Grazing*. Construction earnings from rangeland developments would be the same as under the seasonal grazing alternative, as would recreation expenditures.

Social Attitude and Values

No significant social impacts would result from a decision to implement *Seasonal Grazing*. Some groups and individuals within the area would voice approval or disapproval of any decision, but the area's social diversity would keep BLM decisions on the proposed alternatives from having significant social impacts.

SUMMARY

If implemented, *Seasonal Grazing* or the ephemeral option would wholly or partly meet seven of the eight planning objectives listed in Chapter 1. Rangeland condition would significantly improve, but not to the level identified in the MFP. Objectives for forage allocation, livestock operations, wild burros, and protected plants would be met completely. Improved habitat might require more than 20 years to support reasonable numbers of big game, and more than 10 years might be needed to reach satisfactory condition on 1 million acres of special status animal habitat. Objectives for restoring deteriorated riparian habitats would be met to the extent that yearly rest, habitat management plans, and measures for resource enhancement are effective in protecting woody plant species and increasing broadleaf reproduction.

Impacts of Elimination of Livestock Grazing (No Livestock)

VEGETATION

Eliminating livestock grazing on 1,375,000 acres of public land would significantly impact vegetation. Forage species grazed by livestock would be allowed to complete growth and reproduction. Moreover, utilization of key forage species would greatly decline, improving vigor, reproduction, and seedling establishment.

Eliminating grazing on public land would increase the cover, plant composition, and overall productivity of forage. The most significant increase would occur in high-response areas with productive soils and higher rainfall. In the long term total vegetation is predicted to increase by 7 percent from 490 million to over 524 million pounds. Low-response areas would not improve in the short term, and more than 20 years might be needed for measurable improvement to occur.

Plant Cover

Eliminating livestock grazing would increase plant cover and allow plants to gain vigor and reproduce. Table 4-1 shows projected long-term changes in plant cover by vegetation type. Whereas overall plant cover would not greatly change, increases would be significant over current levels. Plant vigor would significantly improve along with cover and production (Stoddart and Smith, 1955). Eliminating livestock grazing would provide the fastest way to restore deteriorating rangelands in historically overused areas.

Rangeland Condition and Trend

Rangeland condition would improve over much of the EIS area in the long term. Reducing utilization of desirable key forage and the absence of livestock during growing periods would improve vigor, reproduction, and seedling establishment — all indicators of trend. Complete, yearlong rest of public lands would increase the opportunity for completing growth and reproductive cycles. The initial rate of change would depend on current rangeland condition and trend, range site productivity, and plant vigor.

Rangeland condition on 70 allotments with apparent stable or upward trends would improve as a result of reduced grazing pressure on key forage species. Condition would stabilize once the potential of the various areas is reached. Condition on allotments with apparent downward trend would either stabilize or reverse from the yearlong rest. The rate of improvement would depend on plant vigor and climatic conditions. The lower a plant's vigor, the slower would be its rate of recovery. Plant composition would also change in the long term as condition improves (Table 4-3).

In the long term, *No Livestock* would improve the EIS area's rangeland condition as follows: rangeland in excellent condition would increase from 26,400 to 150,400 acres; rangeland in good condition would increase from 412,500 to 558,800 acres; rangeland in fair condition would decrease from 713,600 to 492,000 acres; and rangeland in poor condition would decrease from 222,300 to 173,600 acres. Projected rangeland condition by vegetation type is shown in Table 4-2. Appendix 6 shows projected long-term impacts to rangeland condition by allotment.

Riparian Vegetation

Riparian vegetation would generally improve, even though riparian areas would continue to be grazed by wild burros and big game. Vigorous growths of cottonwood, willow, mesquite, or saltcedar would be restored to most streambanks as well as an understory of grasses and forbs. Improvement would be rapid but would level off in the long term as the areas stabilize (Duff, 1978). Measures for resource protection and enhancement of riparian habitat would be applied to prevent deterioration from agents other than livestock grazing.

Lower utilization and a resulting improvement in the vigor would increase riparian areas in excellent condition from 800 to 2,600 acres and decrease riparian areas in good condition from 5,100 to 5,000 acres, in fair condition from 3,900 to 3,100 acres, and in poor condition from 1,200 to 400 acres (Table 4-2). The percent of ground covered by vegetation would increase from 52 to 58 percent.

Protected Plants

Eliminating livestock grazing would improve the vigor and cover of the three protected plant species affected by grazing. *Mammillaria viridiflora's* chances for seedling establishment would increase as a result of reduced grazing pressure on the perennial grasses it needs for protection and moisture. Wild burros and big game may continue to slightly impact *Juncus articulatus* and *Thelypteris puberula* at Grapevine Springs and South Peoples Spring, but BLM has proposed these two spring sites as areas of critical environmental concern (ACECs) and would develop protective measures in ACEC management plans. Where applicable,

Water Is Critical on Desert Rangelands

Water is critical to proper management of livestock operations and for many wildlife species on desert rangelands. New water developments are proposed by three of the alternatives under study. The reservoirs pictured above provide not only livestock water and shade but also wildlife food and cover.

exclosures and other measures for resource protection and enhancement identified in Chapter 2 would be applied to assure that these species are adequately protected.

SOILS

Erosion and Productivity

Eliminating livestock grazing on public lands would benefit the watershed in the long term by increasing live green plants and litter cover. The additional protective cover would decrease surface runoff and increase the amount of water entering the soil, resulting in greater soil productivity and a more stable watershed condition. In the long term, erosion condition on public land would measurably improve. These projections reflect professional judgment based on rangeland inventory data and projected impacts to vegetation. Riparian soils in a moderate or severe erosion condition would also improve in the long term due to decreased grazing pressure from livestock and wild burros.

Soil Compaction

The effects of different types of grazing management on soil compaction are shown in Table 4-4.

Building rangeland developments would temporarily disturb 891 acres of soil and permanently occupy 191 acres. The plants and soils disturbed would need 3 to 10 years to recover (BLM, 1978). The major impact to the soil would be the 191 acres permanently lost to rangeland developments, but this acreage is slight compared to the total EIS area. During the construction and recovery period, soil compaction and the removal of ground cover would increase erosion potential. But as vegetation and litter increase, soil erosion would decline. The short- and long-term adverse impacts — increased erosion and decreased ground cover — would be slight when compared to the total soil erosion in the EIS area (Table 4-5).

Sediment Yield

Under the *No Livestock* alternative, sediment yields would significantly decline due to long-term increases in vegetation production, less erosion, and greatly reduced grazing pressure in riparian zones. Projected sediment yield changes would be measurable under field conditions.

WATER RESOURCES

Water Quantity

Maximum water consumption by grazing animals would decrease from 63 to 8 acre-feet. Initially, water storage would not change. But in the long term, abandoning some livestock waters could reduce water storage to an unknown extent.

In addition, surface water yields would decrease in the long term throughout much of the EIS area as a result of increased infiltration and greater soil moisture deficits caused by increased vegetation. Watershed cover would slightly increase.

Water Quality

Eliminating livestock grazing on public lands would reduce fecal coliform counts, but increased wildlife and burros could offset the extent of change. Surface water quality in riparian areas would benefit from greatly reduced grazing pressure, increased streambank cover, and fenced exclosures. Ground water quality would be unaffected.

LIVESTOCK GRAZING

Adjustments in Livestock Numbers

Livestock grazing on public rangelands would be phased out over a 5-year period, and the EIS area's livestock industry would annually lose 46,033 AUMs of livestock forage and an undetermined amount of ephemeral forage. Livestock production would decline by over 4,000 cattle.

Ranching Operations

Ranching operations would drastically change. All ranches depend somewhat on federal lands, since leased or privately owned lands are usually inadequate to meet present or future needs. Ranches on the 35 nonintensive allotments with little public land would generally suffer low impacts. The 43 allotments with higher percentages of public land would be forced to reduce herd sizes or seek other sources of forage.

To maintain current levels of operation, highly impacted ranches would have to buy or lease more private or state-administered grazing lands, placing greater pressure on already limited and overburdened resources. Some ranchers might combine nonfederal lands into economical grazing units. An undetermined number of other operators could not continue ranching and would be forced to sell out or stop grazing livestock.

Ranches continuing to operate would face difficult management constraints. A highly intermingled land ownership pattern would limit alternatives for grazing management and require frequent movement of livestock, often by vehicle, from one small pasture to the next. In addition, large investments would be needed to develop waters on isolated tracts to make them suitable for grazing.

WILDLIFE

This section analyzes the impacts of eliminating livestock grazing on wildlife, primarily the effect of vegetation changes on wildlife habitat. Table 4-18 rates impacts of this alternative on wildlife and wildlife habitat.

Introduction

This alternative would eliminate livestock grazing and maintain wild burro populations at 1983 levels in the Alamo Herd Management Area. In the long term it would allow more vegetation production than any other alternative (Table 2-5). Habitat would improve (in the form of decreased competition for a limited resource) more than as a result of increased vegetation production alone, and improvement would be evident in the short and long term. This alternative provides the greatest allocations of vegetation to wildlife for consumption (big game) and cover (other resources) (Table 2-3). Over the long term, vegetation allocated to big game would increase by 67 percent, and vegetation allocated for cover would increase by 15 percent (Table 2-5).

No Livestock is the only alternative that would measurably improve habitat on public lands in the 25 custodial allotments now having a static or downward apparent trend. These lands contain scattered blocks of important habitats in the north of the EIS area, including over 2,000 acres of riparian habitat, 2,000 acres of grassland, and 13,000 acres of valuable chaparral.

Existing waters important to wildlife would be maintained to reduce adverse impact to wildlife habitat. BLM would assume maintenance costs previously borne by the livestock operators. Abandonment of some developments by the operators, however, could leave certain areas without water for wildlife.

The 1,750 miles of new fencing to exclude livestock from public lands would significantly impact big game in many allotments.

TABLE 4-18
WILDLIFE AND HABITAT IMPACT RATINGS UNDER NO LIVESTOCK*

Alternative's Features	Big Game				Special Status Species				
	Mule Deer	Bighorn Sheep	Pronghorn Antelope	Javelina	Federal-Listed Threatened/ Endangered Species	Other Protected Species**	Upland and Small Game	Nongame Wildlife	Riparian Habitats
Grazing Use									
Vegetation Production Available Initially	4	4	4	3	3	3	3	3	4
Vegetation Production Available in 5 Years	5	4	5	4	4	4	4	4	5
Vegetation Production Available in 20 Years	5	4	5	4	4	5	4	5	5
Levels of Grazing Management									
Intensive	NA	NA	NA	NA	NA	NA	NA	NA	NA
Less Intensive	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nonintensive	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ephemeral	NA	NA	NA	NA	NA	NA	NA	NA	NA
Management Facilities									
Water Developments	4	4	4	3	3	4	3	4	NA
Fencing	2	2	2	3	NA	NA	4	4	NA
Totals (Average)	4.0	3.6	4.0	3.4	3.5	4.0	3.6	4.0	4.7
	Average Rating for Alternative 3.9				Average Rating for Existing Situation 2.5				

* Rating system: 1 = most significant adverse impact; 2 = adverse impact; 3 = minor or no impact; 4 = beneficial impact; 5 = most significant beneficial impact; NA = not applicable.
** Proposed threatened or endangered species, state-listed species, BLM sensitive species.

Big Game

Mule Deer

The productivity of mule deer habitat would increase by 7 percent. Allotments with the largest increases would be Aguila, Coughlin, Carco, Santa Maria, Ridgeway Kong, and Ohaco. Forage production would increase greatly in the short term but taper off in the long term. Mule deer would have to compete for forage and space only in the few allotments inhabited by burros (Map 3-5). Range and habitat condition would improve from fair to poor and from good to excellent on over 270,000 acres in the EIS area (20 percent of the public lands). Increased forage could support 1,600 more deer on public lands.

Mule deer habitat could be heavily crossed by fences, particularly in the north and east of the EIS area. Deer deaths from fence entanglement would greatly rise, even with protective features built into the fences. By blocking traditional pathways, fences would also force deer to change their movement patterns.

Pronghorn Antelope

Pronghorn habitat in good and excellent rangeland condition would increase by 20 percent in the long term, and in the short-term the pronghorn's grassland habitat would dramatically change. Plant cover would measurably increase, nearly doubling the height of grasses and forbs. The food and cover limiting factors would be greatly alleviated for pronghorns. In the long term, production would become more stable as perennials and more forbs replace annual grasses.

In the long term, increased forage and cover would attract pronghorn to public land. Fencing, however, would heavily crisscross pronghorn habitat in the Globe and Coughlin "B" allotments, increasing the chance of death and restricting movement in the short and long term.

Desert Bighorn Sheep

The forage productivity of desert bighorn sheep habitat (as determined by plant cover) would increase by 16 percent

in the long term. Over 69,000 acres would improve in rangeland condition, ending present downward trends. Although production would not greatly increase, bighorn sheep would no longer compete with cattle for forage or space, and bighorn would extend their range into the foothills and adjacent mountains. About 55 burros would roam through Bar D 4 and Ekvall allotments where they could compete with reintroduced bighorns for water and space. Forage would increase enough to support a bighorn population over twice as large as at present. Fencing would not severely impact bighorn sheep, since most habitat is on solidly blocked public land.

Javelina

Javelina would continue to expand their range and numbers in the short and long term, free of significant competition for food or cover. Increased forage could support at least 1,040 javelina.

Waterfowl and Shorebirds

Plant cover around waters and riparian habitats would increase significantly, greatly benefiting waterfowl and shorebirds. Many more species would linger in the EIS area during the year, and some might remain to breed.

Upland and Small Game

Upland and small game would benefit from eliminating livestock grazing. Quail cover and forage would increase by at least 16 percent, and populations would fluctuate less than at present. As riparian habitat regenerates in the long term, cover in white-winged dove habitat would greatly increase with a corresponding marked increase in white-wing numbers. Mourning dove populations, however, would not noticeably rise. Desert cottontail and jackrabbit numbers would slightly increase over the long term, primarily due to the increase in plant cover over the EIS area.

Nongame habitat would significantly improve. The 7 percent increase in forage production, increased plant cover, and increased height and cover of unused grasses and forbs would combine to relieve the short- and long-term lack of low-level vegetation required by most nongame wildlife. Nongame habitat in riparian areas would greatly improve in the short and long term. The best habitat, however, would develop in the very long term with the growth of different size classes of riparian trees.

Protected and Sensitive Species

Eliminating livestock grazing would increase many protected and sensitive wildlife populations and improve most protected and sensitive wildlife habitat as follows.

- The productivity of the bald eagle's aquatic and riparian habitat would increase, particularly through increased diversity of acquatic habitat types. In addition, roost trees and prey populations would increase in the long term to the point where bald eagles might breed in the upper Bill Williams drainage.

- Potential peregrine falcon habitat would improve due to increased prey populations of the riparian drainages along parts of the Bill Williams, Santa Maria, and lower Big Sandy Rivers. In the long term, the potential habitat would be more likely to support breeding peregrines.

- In desert tortoise habitat, forage productivity would increase, and competition for winter-spring annuals would nearly end. In the long term, desert tortoise numbers would increase or stabilize at 50 per square mile on all 109,800 acres of habitat.

- In the long term, black hawk populations might increase with improved riparian and aquatic habitat condition. Even with complete protection from grazing, however, enough trees suitable for nesting might not regenerate to replace the declining, overmature trees in the Bill Williams drainage until well beyond 20 years after implementation. The critical long-term period would determine whether black hawks would be important wildlife constituents of the EIS area.

- Zone-tailed hawks would benefit in the long term as the numbers of sites with suitable nesting trees (cottonwoods) increase.

- Great egrets, snowy egrets, and black-crowned night herons would increase their use of stock tanks, areas around Alamo Lake, and parts of the Hassayampa, Santa Maria, Bill Williams, and lower Big Sandy Rivers as stopovers during migration. In the long term, the cover of adjacent riparian vegetation would measurably increase, and nearly 30 percent of riparian areas would improve in rangeland condition. These state-listed birds might then begin to nest in the EIS area.

- Gilbert's skink populations would slightly increase with increased plant and litter cover. The skink would increase its preferred habitat by about 40 percent from the present area of 19,900 acres.

- Gila monster habitat condition would improve, primarily due to increase in prey and litter and in increase in live plant cover.

- The Sonoran mountain kingsnake population would increase as its prey base increases, and its prey base would

Severe Erosion May Accompany Loss of Vegetation on Fragile Soils

Fragile soils do not respond well to loss of vegetation cover or to soil disturbance resulting from trampling, trailing, or other activities. When protective plant cover is depleted, the bare soil cannot withstand the impacts of wind and sudden thunderstorms. As the soil on this site erodes, thousands of years of soil-forming processes are lost along with resources dependent on the soil. Four alternatives would reduce soil erosion by increasing vegetation cover and reducing soil disturbance.

increase with a significant long-term increase in live plant cover.

• Under decreased human and livestock disturbance, the ferruginous hawk in the long term would probably begin breeding on 1,800 acres of desert grassland.

• Nesting success would improve in sharp-shinned and Cooper's hawk habitat, since no significant livestock use would occur on the 34,700 acres.

• The quality of prairie falcon foraging habitat would slightly decline in the long term as poor rangeland condition improves on 44,700 acres.

Riparian Habitat

In the long term, the rangeland condition of riparian habitat would improve by nearly 30 percent (from poor and fair to good and excellent), and no broadleaf riparian habitat would remain in poor condition. Woody riparian plants would flourish (Moore and others, 1979), and the structural diversity of riparian vegetation would increase, greatly benefiting all wildlife, especially nongame and state-listed species. In the long term, the Bill Williams, Santa Maria, and Hassayampa drainages would greatly improve, as would other riparian areas (Map 3-3). Riparian improvement would enhance even nondependent wildlife using the upland habitats (Thomas, Maser, and Rodiek, 1979).

Fire

Eliminating livestock grazing would increase wildlife frequency by increasing fuel production by 15 percent. If allowed to burn significant acreages, wildfire in the pinyon-juniper, grassland, chaparral, and desert shrub vegetation types would increase the production of forage and cover, especially forbs and browse. Wildfires would also speed up beneficial habitat changes in chaparral and grassland vegetation types, improving their rangeland condition (Stoddart and Smith, 1955). Improved rangeland condition in these vegetation types would benefit mule deer, pronghorn antelope, Gilbert's skinks, Gila monsters, golden eagles, prairie

falcons, merlins, and zone-tailed, sharp-shinned, Cooper's, and ferruginous hawks (BLM, 1980a;b).

WILD BURROS

The *No Livestock* alternative would provide for a base herd of 300 burros, which annually would use 1,800 AUMs of forage and 1.7 acre-feet of water on eight allotments. In addition, this alternative would remove 300 burros from 12 allotments.

The following beneficial impacts would result.

- Burros would be removed from the Big Horn, Harquahala, Little Harquahala, and Granite Wash Mountains. Removal would reduce burro competition with bighorn sheep for water, end trampling of desert tortoise critical areas, and provide relief to protected plants within burro herd management areas (HMAs).
- Removing 300 burros would reduce BLM's management costs by ending the need to annually remove 35-50 animals.
- Removing the Little Harquahala herd would reduce the costs and problems of burros entering subdivisions and farms around Salome.
- Removing allotment boundary fences could allow greater mixing of burros for genetic survival.

The *No Livestock* alternative would have the following adverse impacts.

- Burros and wildlife would undergo temporary physical stress during burro removal.
- Removing all burros from the Harquahala-Big Horn Mountains would remove a genepool of red burros and white burros, which are rare in other Arizona herds.
- With the increased herd size, as many as 55 burros would remain on the Bar D 4 and Ekvall allotments at the east end of the Alamo HMA and would conflict with the proposed bighorn establishment areas, protected plant areas, and raptor areas. Intermittent use of solidly blocked nonfederal lands in these allotments by BLM-administered burros would continue to cause problems for the state and private land owners.
- Abandonment of wells by livestock operators could eliminate water for burros in some areas.
- Continued burro use of the area around Alamo Lake administered by the Corps of Engineers would interfere with land and resource management by the Corps, the Arizona Game and Fish Department (AG&FD), and the Arizona State Parks Department. Burro requirements for forage and water from the area conflict with AG&FD plans to fence the lake and create waterfowl habitat by planting small-grain crops in the river bottom and at the headwaters of the lake.
- Fences built to keep livestock from straying onto federal lands from nonfederal lands could interfere with burro movement and, in the worst-case situation, fragment the herd and divide the genepool.

CULTURAL RESOURCES

Eliminating livestock grazing would greatly reduce the impacts of grazing management on cultural resources (Table 4-8). Site deterioration from livestock trampling and rangeland development construction would end, and erosion would decrease. Installing 1,750 miles of fence in remote areas might increase isolated occurrences of vandalism, but the decrease in grazing-related uses and travel in the EIS area would generally decrease vandalism. On the other hand, fence construction could disturb undiscovered sites.

RECREATION

Eliminating livestock grazing would impact hunting, ORV use, and recreation sightseeing. Increases in small and upland game could increase hunter use visitor days by an undetermined amount. Deer and javelina populations are projected to increase by 3,100 animals, increasing big-game hunting by 2,300 visitor days per year. Any increase in game would also increase opportunities for viewing wildlife (see Tables 4-10 and 4-11). The 1,750 miles of proposed fencing would decrease off-road vehicle cross-country opportunities, but the amount of decrease cannot be determined.

VISUAL RESOURCES

Vegetation increases resulting from eliminating livestock grazing could change the color and texture of the landscape. Any change would be gradual and most evident along roads. Although contrast ratings would be completed, fence development would cause visual contrasts. Of the four basic visual resource management elements (form, color, texture, line), line contrasts would be the greatest. An estimated 1,750 miles of fencing would have to follow legal boundaries, causing some stretches to be skylined. For criteria and methodology, see BLM Manual, Section 8400.

WILDERNESS VALUES

On EIS area lands established as wilderness study areas, all rangeland management will comply with BLM's *Interim Management Policy and Guidelines for Lands under Wilderness Review* (BLM, 1979b). No impacts on wilderness values are expected.

ECONOMIC AND SOCIAL CONDITIONS

Economic Conditions

This section describes the economic impacts to the EIS area ranchers and the community from the *No Livestock* alternative, including impacts from expected changes in construction income and outdoor recreation use. Impacts to individual ranchers cannot be quantified due to lack of financial data for individual ranches. Rather, impacts to these operators are analyzed by using the three representative ranch income statements presented in Chapter 3. Information from these statements is used to determine the impacts to the economy of the economic study area.

Ranch Budgets

Small Ranch. Eliminating livestock grazing from public lands in the EIS area would reduce the herd size of the typical small ranch by 85 percent, from 48 to 7 cows. Annual net revenue would fall from $5,302 to $522. Assuming the typical small ranch would keep its herd size of seven cows, the present value of the small ranch's net revenue over a 20-year period amounts to $5,370. Such revenues under present management would amount to $54,570. Although some ranchers have outside income to supplement ranch income, the herd reduction would probably put some ranchers out of business. Other ranchers would probably maintain a small herd on private and state lands.

Medium-Size Ranch. The typical medium-size ranch would be reduced by 73 percent, from 129 to 35 cows. Annual net revenue would decrease from $12,093 to $2,239. The present value of the medium-size ranch's net revenue over a 20-year period under present management amounts to $124,460, whereas such revenues under elimination of livestock grazing amount to $23,040. Since many ranchers in the medium-size class support themselves and their families solely from their ranch operation, *No Livestock* would force ranchers to seek outside income and run a small number of cattle on private and state lands. Other ranchers might be forced to sell their operations and find other employment.

Large Ranch. The herd size of the typical large ranch would decrease by 83 percent, from 460 to 78 cows. Annual net revenue would decrease from $33,812 to $3,667. The present value of the ranch's net revenue over a 20-year period under present management amounts to $348,000, whereas such revenues under elimination of livestock grazing amount to $37,740. This loss of net revenue would probably force many large ranchers out of business.

In summary, the severe reductions under this alternative would probably cause all of the medium-size and large operators to seek outside income. Ranches put up for sale might be combined to form an economic unit, but tracts with large amounts of BLM land would be difficult to run as ranches due to the distance between state and private holdings.

Ranch Finance

Eliminating grazing on public land would hinder the rancher's ability to borrow both operating and long-term capital. The value of the ranches would decrease, reducing the value of the ranch's assets to the point that most bankers would be reluctant to lend either short- or long-term capital. BLM economists calculated that the market value of the typical small ranch would drop from $85,500 to $12,000, that the market value of the medium-size ranch would drop from $229,500 to $55,500, and that the market value of the typical large ranch would drop from $1,020,000 to $124,500.

Ranch net revenues would greatly decline under this alternative, which combined with the large drop in ranch values, would impair the rancher's ability to borrow capital or repay existing loans.

Regional Economics

The *No Livestock* alternative would decrease gross receipts, net revenues, and labor requirements of EIS area ranches. Annual gross receipts from the sale of livestock for the 33 EIS area ranches would drop from $996,000 to $191,000, and the ranches' contribution to the economic study area's livestock sales would drop from 0.32 to 0.06 percent. Ranch operating expenses would decrease from $497,000 to $128,000, and net revenues would decrease from $499,000 to $63,000. In addition, labor requirements of the 33 EIS area ranches would drop from 23 to 3 workyears, and earnings from this ranch employment would decrease from $242,000 to $32,000.

Installing fences, cattleguards, and gates would add $765,100 per year in earnings to the economy of the study area, but this amount is less than 1 percent of the area's yearly construction earnings.

Annual visitor use for big-game hunting in the planning area would increase by 2,300 visitor days after 20 years, increasing yearly recreation expenditures by $46,000. These expenditures, however, are insignificant when viewed on a regional level.

Benefit-Cost Analysis

Because of a lack of quantifiable information on the benefits expected under the elimination of livestock graz-

ing, a benefit-cost analysis was not conducted for this alternative.

Social Attitudes and Values

No significant social impacts would result from a decision to implement the *No Livestock* alternative. Some groups and individuals within the area would voice approval or disapproval of any decision, but the area's social diversity, would keep BLM decisions on the proposed alternatives from having significant social impacts.

SUMMARY

Eliminating livestock grazing from the public lands would meet seven of the eight planning objectives listed in Chapter 1. Objectives for improved rangeland condition, increased forage, viable burro herds, improved plant and animal habitat, and restored riparian zones would be met completely. Livestock operations, however, would be severely disrupted and long-term instability would accrue to operations and communities dependent on the public lands.

Energy Conservation

No detailed analysis was completed on which alternative would be most efficient in conserving energy. We believe, however, that energy use is not a major issue, since relatively little fuel would be needed to implement any of the five alternatives.

Energy would be consumed primarily in operating vehicles and equipment for monitoring and studies, management operations, and the construction and maintenance of rangeland developments. The construction of rangeland developments under *No Livestock* and *Intensive Grazing* would require the largest short-term consumption of fuel, whereas the alternatives would differ little in energy use for monitoring and studies. Management practices under *Intensive Grazing* would require greater energy use than other alternatives.

None of the alternatives offer many opportunities for conserving energy. Gasohol or an equivalent fuel could be substituted for gasoline in vehicles and equipment. Wind-driven pumps might be installed at well sites instead of electricity-powered or gasoline-fueled pumps. Travel by foot or horseback might be substituted for vehicle travel during inspections, maintenance, monitoring, and studies.

Mitigating Measures

Measures that BLM has determined to be needed to protect or enhance resource conditions under any of the alternatives have been described in Chapter 2. This section presents additional mitigating measures that BLM managers may select during decisionmaking or development and implementation of activity plans to reduce impacts or enhance resource management. Measures that lie outside the jurisdiction of BLM but that might be employed to reduce impacts have also been included.

VEGETATION

• Rangeland productivity on some nonintensive allotments is projected to decline over a 20-year period without reduced grazing pressure or improved management. BLM could encourage private operators running livestock on nonintensive allotments with little federal land to develop ranch plans in cooperation with the Soil Conservation Service, BLM, the Arizona State Land Department, the Arizona Range Task Force, universities, and other local, state, or federal agencies. Ranch plans could incorporate management systems and set stocking levels that would restore rangeland productivity and provide for multiple-use benefits.

LIVESTOCK GRAZING

• Many livestock operators in the EIS area have acquired years of valuable rangeland management experience and want to improve the long-term productivity of public, state, and private rangelands within their ranches. The Lower Gila Resource Area could implement an expanded experimental stewardship program to test new ideas that encourage individual operators to voluntarily change management or make investments to improve rangeland conditions. The program would be implemented in accordance with provisions of the Public Rangelands Improvement Act and other applicable directives. Given success with initial projects and broadened authority, the program could be opened to wider participation from cooperating permittees.

• Suspension of current grazing preference and lowered incomes from reduced livestock sales would adversely affect the ability of some ranchers to borrow cash for operating expenses. New or existing programs could provide low-interest or federally backed loans to such operators in cooperation with agencies such as the Farmers Home Administration and the Agricultural Stabilization and Conservation Service. Such loans would ease the impact until current levels of income and grazing preference are restored.

Rangeland Condition Varies With Grazing Practices

Rangeland condition on similar range sites may differ due to past grazing practices. The photo on the right shows an area in good condition that has been properly managed through rest at critical growing periods and has an apparent upward trend. The photo on the left shows a similar range site in a lower condition class. This area still has some good forage plants, but production is lower and fewer species of grass or desirable shrubs occur.

WILDLIFE

• Wild burro-bighorn sheep competition for forage, water, and space inhibits expansion of bighorns into their historic and potential habitat. In cooperation with the Arizona Game and Fish Department, BLM could redefine the upper limits of the Alamo Herd Management Area so that burros are excluded from the Black Mesa bighorn reintroduction area

• Disturbed areas around water developments create unsatisfactory conditions for some wildlife species. As part of its monitoring plan, BLM could study the effects of livestock overgrazing on wildlife food and cover around waters and develop and implement management guidelines to reduce the size and impact of these areas.

• Livestock management developments (windmills, troughs, salting stations, corrals) often occur in riparian zones, leading to a marked disturbance of the habitat. Existing and future livestock management developments could be relocated at least 2 miles away into the uplands, decreasing pressure on the riparian zones.

• Livestock management developments near desert tortoise habitat would concentrate livestock, increasing forage competition and tortoise deaths. Developments could be located more than 3 miles from desert tortoise habitat to avoid these impacts.

• BLM's proposal for rehabilitating riparian habitats relies heavily on implementing allotment management plans and habitat management plans, which take time and are subject to budget constraints. In place of such plans, BLM could redefine allotment boundaries, adjust season of use, or in some cases suspend or defer grazing of allotments or portions of allotments to allow riparian habitats to recover at a faster rate with reasonable prospect of success.

WILD BURROS

• Removing wild burros from the Harquahala and Big Horn Mountains would remove a genepool of 10 to 15 red or white burros. During the capture program, BLM could transfer these animals to the Alamo Herd Management Area (HMA) on a one-for-one replacement for more common gray animals and thus preserve this unique source of diversity.

• The Alamo HMA includes large sections of solidly blocked state lands on the Bar D 4 and Ekvall allotments where federally owned burros conflict with state grazing leases, bighorn sheep transplant proposals, and areas supporting concentrations of protected plants and animals. BLM could eliminate the conflicts by adjusting the HMA boundary to the west boundary fence of the Bar D 4 allotment and removing burros east of the fence.

Unavoidable Adverse Impacts

Unavoidable adverse impacts are the adverse impacts of the *Proposed Action* that cannot be mitigated. Such impacts are often referred to as "residual" impacts. They are unavoidable mainly because either (1) the proposed action directly conflicts with other values or (2) the cost of mitigation would be prohibitively high. Unavoidable adverse impacts are listed below.

• New rangeland developments would permanently disturb 9 acres of soil and vegetation.

• Unfenced spring and riparian habitats accessible to livestock would remain in unsatisfactory condition.

• Concentrated livestock grazing around 12 new water developments would maintain 500 acres of habitat in unsatisfactory condition.

• The construction of 41 miles of new fence could restrict big-game movement and increase the potential for big-game (particularly mule deer) entanglement in fences.

• Livestock would continue to compete with wildlife until grazing systems or adjustments are implemented. During this time, most of the EIS area would remain under current conditions.

• Suspended grazing preferences would reduce the number of livestock permitted to graze on public lands.
Short-Term Reduction: 9,104 AUMs (16%)
Long-Term Reducation: 4,425 AUMs (8%)

• Long-term ranch values on the typical large ranch would decline by 20 percent because of reduced livestock grazing authorizations.

• Wild burro capture programs would cause stress for animals removed or disturbed during the chase.

• The additional time and labor involved in maintaining rangeland developments and in moving livestock to implement grazing systems would increase costs to livestock operators.

• Visual resources would be adversely impacted by the placement of rangeland developments in previously undisturbed areas.

• Subsurface cultural resources not discovered in initial surface surveys could be damaged or destroyed during construction of rangeland developments. In addition, vandalism could occur at cultural resource sites.

Irreversible and Irretrievable Commitments of Resources

This section identifies the irreversible and irretrievable commitments of resources resulting from the proposed action. The term "irreversible" refers to what is incapable of

being reversed: once something is started, it would continue. The term "irretrievable" means irrecoverable: once something is used, it cannot be replaced.

• Construction of rangeland developments would result in the permanent loss of 9 acres of forage. Soil disturbance during construction and use of the developments would result in a small and insignificant loss of productivity.

• Proposed livestock grazing and rangeland developments could disturb certain cultural resources, either directly or indirectly through vandalism. The irretrievable loss of historical and archaeological sites for future study would deplete or alter the nonrenewable cultural resource base and could result in a gap in the history of the area. The mitigation of impacts by salvage - surface collection or excavation rather than avoidance - would also lead to an irretrievable commitment of the resource.

Relationship Between Local Short-Term Uses of Man's Environment and Maintenance and Enhancement of Long-Term Productivity

During the period of implementation (1983-1989), BLM proposes a number of actions affecting the short-term use of the public rangelands in the EIS area. Main elements of the proposal include allocating forage to consumptive uses (the first allocation ever made to wildlife and wild burros in the area), developing specific activity plans for livestock grazing and wildlife habitat, implementing intensive grazing systems, constructing rangeland developments, adjusting livestock and wild burro numbers, and monitoring rangeland performance to determine the effectiveness of the program. The purposes of these actions are to bring grazing in line with the carrying capacity of the public rangelands, protect critical resources including sensitive riparian habitats, increase rangeland productivity, and provide for greater multiple-use benefits in the rangeland management program.

Twenty years after the proposals are fully implemented, rangeland condition would have improved throughout much of the EIS area. Average utilization of key forage by grazing animals would be held to moderate levels between 40 and 60 percent, leading to increased vigor and production of plants and increased plant cover. Minor benefits would accrue through less erosion and sedimentation and improved water quality. Conflicts in important wildlife habitats would be reduced and deteriorated riparian habitats restored, thus preserving dependent populations of wildlife. Big-game numbers would increase by 10 percent. A stable and viable herd of wild burros would be maintained and livestock operations stabilized at a satisfactory level of production.

APPENDICES

APPENDIX 1
LOWER GILA NORTH EIS SCOPING PROCESS

The Council on Enviornmental Quality's "Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act" (40 CFR 1500-1508) require federal agencies to begin an early and open process for determining the scope of issues to be addressed in an environmental impact statement (EIS). Agencies are directed to invite the participation of affected federal, state, and local agencies and other interested parties in identifying significant issues and alternatives to be addressed in the EIS.

Extensive public participation was invited throughout the development of the Lower Gila North Land Use Plan and in preparation of the grazing EIS. The following list summarizes the actions taken:

Spring 1979	Letter sent to grazing allottees regarding rangeland inventory and planning process.
May 1979 - February 1980	District newsletters announced intent to prepare a land use plan and a grazing EIS.
July 1980	Meeting with EIS area ranchers held in Wickenburg to gather information for ranch budgets and economic analysis.
September 1980	Information sheet sent to individuals and organizations on District mailing list, announcing intent to prepare land use plan and soliciting public participation.
October 1980	Published in the Federal Register a Notice of Intent to prepare a land use plan with a call for public participation.
November 1980	Open house held in Wickenburg to explain the planning process to the interested public.
November 1980	Planning information packet mailed to prospective participants in the public workshops.
November 1980	Bus tour conducted to acquaint members of workshop groups with the resources of the planning area.
January 1981	Public workshop held in Phoenix to facilitate completion of unit resource analysis and management framework plan (MFP) Step 1.
March 1981	Phoenix District Multiple-Use Advisory Board assembled to review MFP Step 2 recommendations and to make further suggestions.
March 1981	Summary of resource management proposals sent to workshop participants.
April 1981	Public workshop held to resolve resource proposal conflicts in Step 2 of the MFP. League of Women Voters assisted.
May 1981	Notice of Intent to prepare an EIS with call for public comments published in the Federal Register.
July 1981	MFP summary sent to interested public with invitation to attend MFP Step 2 open houses.
July 1981	Open houses held in Phoenix and Wickenburg to present MFP Step 2 recommendations and to identify significant issues and alternatives to be addressed in the grazing EIS.

In addition, BLM representatives met numerous times in the field with ranchers during the rangeland inventory. BLM consulted with representatives of the Soil Conservation Service, the Arizona State Land Department, and the Arizona Game and Fish Department during the inventories to check resource data, coordinate methodologies, and exchange information.

Members of the Phoenix-Lower Gila Resource Area's Grazing Advisory Board were informed of District plans and progress throughout the inventory and planning process. The BLM area manager also personally contacted Boards of Supervisors of counties affected by the planning proposal to advise them of BLM's role and opportunities to comment. News releases were issued periodically throughout the process to keep the public informed and to foster greater participation.

APPENDIX 2
VEGETATION METHODOLOGY AND RANGELAND INVENTORY CRITERIA

Inventory Criteria

The Phoenix District completed a rangeland survey of the Lower Gila North EIS area from 1979-1980, using BLM's rangeland inventory method for mapping and the Soil Conservation Service (SCS) method for determining condition and trend.

BLM resource specialists used recent natural-color aerial photographs, topographic maps, soil survey information, and a helicopter to map preliminary range sites or complexes of range sites. SCS provided technical range site guides for the planning area, and the Arizona State Land Department inventoried state lands concurrently, using the range site concept.

The preliminary map of range sites was then verified in the field and further subdivided by condition class and vegetation type. The mappable unit was called a site writeup area (SWA). The SWA may be a homogeneous unit (strata) or a complex of strata. Strata consist of a range site with the same condition class and vegetation type within an allotment. Key parameters such as vegetation species, production data, and apparent trend were assessed on a strata basis within each allotment and documented on field writeup sheets.

Once strata were determined, rangeland specialists visited each strata, noting vegetation species, estimating total vegetation production and percent composition by weight, and determining apparent trend and current erosion conditions.

This procedure was completed on all strata in each allotment. Data gathered in this process include (1) total annual vegetation production (ephemeral and perennial), (2) percent species composition by weight, (3) phenology of key species, (4) rangeland suitability for cattle, (5) rangeland condition and apparent trend, (6) soil surface factor (erosion), (7) potential vegetation production (by using range sites), (8) soil classification, and (9) location and condition of rangeland developments.

Determination of Rangland Condition and Apparent Trend[1]

Rangeland Condition - The rangeland condition of areas within a range site was determined by comparing the present plant community to the climax plant community, as shown by the technical guide for the site. For the existing plant community, specialists counted no more than the maximum weight (or percentage of total production) shown on the guide for any species in the climax plant community.

The amount of all climax species not exceeding that shown on the guide was totaled to show the relative ecological rating or numerical evaluation of the stand. The rating will range from 0 to 100, depending on how closely the plant community resembles the climax plant community for the range site.

The following four classes were used to express the degree to which the present plant community composition reflects climax composition.

Range Condition Class	Percentage of Present Plant Community that is Climax for the Range Site
Excellent	76-100
Good	51-75
Fair	26-50
Poor	0-25

Guides based on the weight of species in the climax plant community truly express ecological condition. A condition rating based on the percentage of composition alone may be adjusted if the total production is less than that characteristic for the condition class. For example, a rating determined by counting the percentage of each climax species may show that the existing plant community is in near-climax condition but that the production of these species is less than expected for near-climax condition. The condition rating can then be lowered, considering current growing conditions.

Apparent Trend - The present ecological rangeland condition rating alone does not tell whether the plant community is improving or deteriorating in relation to its potential. Trend is a separate means needed for assessing what is happening to the plant community. Existing rangeland condition results from a sustained trend over time. Trend should be known when planning the use, management, and treatment for maintaining or improving rangeland. The following vegetation and soil characteristics, showing apparent trend in rangeland condition, were evaluated in the field during the rangeland survey: plant composition; seedling and young plant abundance; plant residues; plant vigor; and solid surface factors such a bare ground, soil crusting, stone cover, compaction, plant hummocking, and soil movement.

Determining Initial Stocking Rates

Initial stocking rates for the EIS area were determined by calculating average licensed use during the last 5 years (1976-1980), and using data gathered during 1979-1980 rangeland inventory to identify allotments that may need adjustments in stocking rates. On allotments that have acceptable condition and apparent trend, BLM has determined that the 5-year average licensed use is a good initial stocking rate. Allotments the inventory indicated did not have acceptable condition or apparent trend will also have an initial stocking rate based on past 5-year average licensed use, but will receive intensive monitoring to provide the basis for any needed adjustments.

Projection of Usable Forage Production Increases and Future Rangeland Condition

Potential usable forage within a 20-year timeframe for all alternatives was determined for each vegetation type under poor, fair, good, and excellent rangeland conditions from vegetation inventory data. Projected changes in forage production were based on the different ranges of response that can be expected from vegetation under various stocking levels and management systems.

Rangeland condition was projected by vegetation type using the following criteria: 1) current rangeland condition; 2) apparent trend; 3) range site; 4) potential for response; 5) proposed management and use; 6) soils, and 7) precipitation.

[1] Soil Conservation Service, 1976c.

APPENDIX 3
CONDITION AND APPARENT TREND BY ALLOTMENT

Allotment Name	Condition (Acres)*					Apparent Trend (%)			Overall
	Poor	Fair	Good	Excellent	Total	Up	Static	Down	Apparent Trend
Aguila	42,934	84,428	84,603	11,968	223,933	2	96	2	Static
Alamo	19,389	9,530	3,304	0	32,223	2	98	--	Static
Auza	3,771	4,449	1,791	0	10,011	--	66	34	Down
Babcock	2,397	10,288	0	0	12,685	8	85	7	Static
Bar D 4	3,017	10,631	2,328	0	15,976	12	88	--	Static
Bialac	1,090	6,708	8,722	700	17,220	--	100	--	Static
Bodfish	383	607	995	0	1,985	10	56	34	Static
Brown, Buck	510	3,547	223	0	4,280	4	76	20	Static
Cactus Garden	0	659	1,637	0	2,296	59	41	--	Up
Cain	9	325	114	0	448	1	99	--	Static
Calhoun	15,063	14,596	11,859	0	41,518	--	100	--	Static
Carco	11,427	24,228	442	0	36,097	77	23	--	Up
Carter	0	313	0	0	313	100	--	--	Up
Carter Herrera	386	18,489	9,839	0	28,714	2	98	--	Static
Central AZ	2,431	5,477	1,489	0	9,397	--	100	--	Static
Coughlin "A"	4,324	7,608	6,008	0	17,940	43	50	7	Up
Coughlin "B"	135	428	1,187	0	1,750	68	27	5	Up
Cross Mountain	642	95	0	0	737	--	100	--	Static
Date Creek	1,404	480	1	0	1,885	--	11	89	Down
Desert Hills "A"	0	4,812	1,732	0	6,544	16	84	--	Static
Desert Hills "B"	0	11,072	3,890	0	14,962	16	84	--	Static
Douglas	160	14,539	15,402	5,095	35,196	54	42	4	Up
Eagle Eye	2,345	1,236	256	0	3,837	24	76	--	Static
Eagle Eye 6Y	858	1,000	1,609	0	3,467	--	74	26	Down
Echeverria	2,050	7,481	5,883	0	15,414	--	100	--	Static
Effus	1,562	11,440	2,024	4	15,030	2	60	38	Down
Ekvall	0	2,389	381	0	2,770	79	21	--	Up
Flat Iron	2,323	6,392	8,012	476	17,203	8	82	10	Static
Foraker	30	603	324	0	957	60	40	--	Up
Garcia	0	5,469	6,757	308	12,534	73	27	--	Up
Globe	0	620	2,924	0	3,544	100	--	--	Up
Gordon, R.	0	537	213	0	750	94	6	--	Up
Grantham	26	1,216	129	0	1,371	--	100	--	Static
Hancock	2,226	38,728	15,271	2,290	58,515	9	91	--	Static
Harcuvar	24,253	61,539	14,408	0	100,200	15	78	7	Static
Hassayampa	4,061	10,317	38,683	2,183	55,244	2	93	5	Static
Hawkins	390	1,343	98	0	1,831	--	82	18	Static
Heine	12	218	10	0	240	37	14	49	Static
Hogue Produce	3,953	4,283	793	0	9,029	--	99	1	Static
James, H.	307	111	113	0	531	--	73	27	Down
Jenner	137	1,821	0	0	1,958	--	47	53	Down
Jones	9,984	15,273	1,705	0	26,962	10	32	58	Down
KMJ	268	1,143	3	0	1,414	--	81	19	Static
Lamberson	0	14,141	9,725	0	23,866	3	97	--	Static
Leidig	149	31,117	15,933	0	47,199	3	97	--	Static
Loma Linda	1,810	17,585	15,316	179	34,890	33	57	10	Static
Los Caballeros	0	8,615	4,773	0	13,388	42	58	--	Up
Medd	0	2,710	1,913	0	4,623	94	4	2	Up
Moralez	0	3,876	2,924	0	6,800	58	42	--	Up
Narramore	104	10,437	2,408	0	12,949	5	95	--	Static
Ohaco	7,875	33,755	12,760	0	54,390	1	77	22	Static
Orosco	7,334	8,023	452	0	15,809	--	100	--	Static
Palmerita	7,629	21,999	4,911	0	34,539	20	80	--	Static
Park, H.	0	796	4	0	800	--	100	--	Static
Park, R.	6	185	288	0	479	29	38	33	Static
Park, R. & E.	94	215	1,131	0	1,440	--	44	56	Down
Peters	115	24	8	0	147	--	100	--	Static
Pipeline	8,564	19,503	2,848	0	30,915	44	56	--	Up
Primrose	3,031	29,193	16,262	0	48,486	--	99	1	Static
Rees	5,046	15,232	2,662	0	22,940	55	29	14	Up
Ridgeway Kong	386	6,463	5,678	0	12,527	32	68	--	Up
R. Santa Ynez	1,187	732	1	0	1,920	--	38	62	Down
Saddle Mountain	0	2,557	6,579	1,020	10,156	10	90	--	Static
Salome Community	164	6,411	3,978	0	10,553	--	100	--	Static
Santa Maria	9,034	24,882	6,943	0	40,859	22	75	3	Static
Satathite	0	79	0	0	79	--	100	--	Static
Sitgreaves Red Hill	2,681	12,259	10,584	0	25,524	5	95	--	Static
Sky Arrow	438	7,784	976	0	9,198	5	89	6	Static
Sprouse	0	2,829	15,022	455	18,306	60	40	--	Up
Thompson	28	622	598	0	1,248	--	100	--	Up
Turner	550	2,794	5,741	1,744	10,829	5	95	--	Static
Van Keuren	0	3,670	194	0	3,864	--	100	--	Static
Vasilius	0	0	80	0	80	100	--	--	Up
Wellik	684	1,151	125	0	1,960	--	1	99	Down
Whitehead	0	1,450	1,423	0	2,873	48	49	3	Up
White Tanks	NA	NA	NA	NA	18,201	NA	NA	NA	NA
Wickenburg "A"	904	13,924	1,363	0	16,191	--	84	16	Static
Wickenburg "B"	0	2,497	234	0	2,731	--	100	--	Static
Wilson	213	487	2,580	0	3,280	1	98	1	Static

* Acres reflect measurements made during the rangeland inventory and may differ from those shown on allotment billings. BLM will update files and billing statements as time permits.

APPENDIX 4
FORAGE ALLOCATION IN AUMS BY ALLOTMENT
Proposed Action

Allotment	Initial			Projected (20 Years)		
	Livestock	Burros	Wildlife	Livestock	Burros	Wildlife
Aguila	5,073	0	1,176	6,145	0	1,731
Alamo	0	240	122	180	240	122
Auza	948	0	108	948	0	108
Babcock	380	0	36	380	0	69
Bar D 4	300	120	108	360	120	108
Bialac	0	0	108	30	0	108
Bodfish	264	0	51	264	0	51
Brown, Buck	732	0	29	732	0	29
Cactus Garden	300	0	12	311	0	13
Cain	72	0	120	72	0	120
Calhoun	503	0	228	803	0	228
Carco	2,330	0	113	2,469	0	218
Carter	59	0	72	59	0	72
Carter Herrera	611	0	15	641	0	15
Central AZ	888	0	180	888	0	180
Coughlin "A"	1,561	0	300	1,754	0	405
Coughlin "B"	168	0	72	168	0	72
Cross Mountain	12	0	33	12	0	33
Date Creek	108	0	18	108	0	15
Desert Hills "A"	393	0	48	393	0	61
Desert Hills "B"	618	60	105	618	60	105
Douglas	1,177	0	432	1,209	0	432
Eagle Eye	0	0	24	0	0	24
Eagle Eye 6Y	137	0	24	137	0	24
Echeverria	713	0	96	822	0	107
Effus	603	0	84	591	0	84
Ekvall	312	60	180	312	60	180
Flat Iron	570	0	72	598	0	72
Foraker	180	0	160	180	0	160
Garcia	768	0	96	844	0	107
Globe	648	0	150	648	0	150
Gordon, R.	144	0	19	144	0	19
Grantham	156	0	75	156	0	75
Hancock	1,483	0	192	1,608	0	290
Harcuvar	2,915	0	432	2,915	0	499
Hassayampa	0	0	288	0	0	288
Hawkins	276	0	24	276	0	24
Heine	24	0	0	24	0	0
Hogue Produce	1,368	0	48	1,368	0	48
James, H.	60	0	12	60	0	12
Jenner	384	0	60	384	0	60
Jones	584	0	120	563	0	120
KMJ	120	0	168	120	0	168
Lamberson	513	0	65	513	0	77
Leidig	1,200	0	180	1,319	0	272
Loma Linda	1,602	0	125	2,166	0	217
Los Caballeros	947	0	96	988	0	107
Medd	516	0	88	516	0	88
Moralez	768	0	52	768	0	93
Narramore	374	0	24	379	0	27
Ohaco	1,476	0	336	1,557	0	336
Orosco	546	0	50	714	0	84
Palmerita	924	240	264	1,003	240	367
Park, H.	108	0	6	108	0	6
Park, R.	108	0	24	108	0	24
Park, R. & E.	192	0	24	192	0	24
Peters	6	0	8	6	0	8
Pipeline	1,308	0	120	1,414	0	200
Primrose	0	360	423	120	360	423
Rees	746	0	108	746	0	151
Ridgeway Kong	760	0	120	782	0	133
R. Santa Ynez	360	0	72	360	0	72
Saddle Mountain	212	0	36	214	0	36
Salome Community	233	0	96	354	0	125
Santa Maria	2,337	180	126	2,648	180	211
Satathite	12	0	4	12	0	4
Sitgreaves Red Hill	255	0	48	258	0	48
Sky Arrow	1,056	0	156	1,213	0	278
Sprouse	810	0	72	972	0	80
Thompson	144	0	12	144	0	12
Turner	0	0	180	0	0	180
Van Keuren	240	0	84	240	0	84
Vasilius	24	0	18	24	0	18
Wellik	216	0	60	210	0	60
Whitehead	576	0	93	576	0	93
White Tanks	0	0	246	0	0	246
Wickenburg "A"	2,287	0	204	2,559	0	355
Wickenburg "B"	253	0	108	253	0	108
Wilson	0	0	36	0	0	36
Grand Totals	49,051	1,260	9,574	53,730	1,260	11,489

APPENDIX 4 (Continued)
FORAGE ALLOCATION IN AUMS BY ALLOTMENT
No Action

Allotment	Initial			Projected (20 Years)		
	Livestock	Burros	Wildlife	Livestock	Burros	Wildlife
Aguila	5,073	0	0	5,073	0	0
Alamo	0	0	0	0	0	0
Auza	948	0	0	948	0	0
Babcock	379	0	0	379	0	0
Bar D 4	300	0	0	300	0	0
Bialac	0	0	0	0	0	0
Bodfish	264	0	0	264	0	0
Brown, Buck	732	0	0	732	0	0
Cactus Garden	74	0	0	74	0	0
Cain	72	0	0	72	0	0
Calhoun	2,304	0	0	2,304	0	0
Carco	2,330	0	0	2,330	0	0
Carter	59	0	0	59	0	0
Carter Herrera	611	0	0	611	0	0
Central AZ	888	0	0	888	0	0
Coughlin "A"	3,096	0	0	3,096	0	0
Coughlin "B"	168	0	0	168	0	0
Cross Mountain	12	0	0	12	0	0
Date Creek	108	0	0	108	0	0
Desert Hills "A"	398	0	0	398	0	0
Desert Hills "B"	618	0	0	618	0	0
Douglas	1,722	0	0	1,722	0	0
Eagle Eye	0	0	0	0	0	0
Eagle Eye 6Y	228	0	0	228	0	0
Echeverria	713	0	0	713	0	0
Effus	1,155	0	0	1,155	0	0
Ekvall	312	0	0	312	0	0
Flat Iron	900	0	0	900	0	0
Foraker	180	0	0	180	0	0
Garcia	769	0	0	769	0	0
Globe	648	0	0	648	0	0
Gordon, R.	144	0	0	144	0	0
Grantham	156	0	0	156	0	0
Hancock	1,620	0	0	1,620	0	0
Harcuvar	5,292	0	0	5,292	0	0
Hassayampa	0	0	0	0	0	0
Hawkins	276	0	0	276	0	0
Heine	24	0	0	24	0	0
Hogue Produce	1,368	0	0	1,368	0	0
James, H.	60	0	0	60	0	0
Jenner	384	0	0	384	0	0
Jones	900	0	0	900	0	0
KMJ	120	0	0	120	0	0
Lamberson	513	0	0	513	0	0
Leidig	1,200	0	0	1,200	0	0
Loma Linda	1,602	0	0	1,602	0	0
Los Caballeros	977	0	0	977	0	0
Medd	516	0	0	516	0	0
Moralez	768	0	0	768	0	0
Narramore	468	0	0	468	0	0
Ohaco	1,476	0	0	1,476	0	0
Orosco	546	0	0	546	0	0
Palmerita	924	0	0	924	0	0
Park, H.	108	0	0	108	0	0
Park, R.	108	0	0	108	0	0
Park, R. & E.	192	0	0	192	0	0
Peters	6	0	0	6	0	0
Pipeline	1,267	0	0	1,267	0	0
Primrose	0	0	0	0	0	0
Rees	1,068	0	0	1,068	0	0
Ridgeway Kong	1,007	0	0	1,007	0	0
R. Santa Ynez	360	0	0	360	0	0
Saddle Mountain	552	0	0	552	0	0
Salome Community	247	0	0	247	0	0
Santa Maria	2,329	0	0	2,329	0	0
Satathite	12	0	0	12	0	0
Sitgreaves Red Hill	680	0	0	680	0	0
Sky Arrow	1,056	0	0	1,056	0	0
Sprouse	819	0	0	819	0	0
Thompson	144	0	0	144	0	0
Turner	0	0	0	0	0	0
Van Keuren	240	0	0	240	0	0
Vasilius	24	0	0	24	0	0
Wellik	216	0	0	216	0	0
Whitehead	576	0	0	576	0	0
White Tanks	0	0	0	0	0	0
Wickenburg "A"	2,496	0	0	2,496	0	0
Wickenburg "B"	253	0	0	253	0	0
Wilson	0	0	0	0	0	0
Grand Totals	58,155	0	0	58,155	0	0

APPENDIX 4 (Continued)
FORAGE ALLOCATION IN AUMS BY ALLOTMENT
Intensive Grazing

Allotment	Initial			Projected (20 Years)		
	Livestock	Burros	Wildlife	Livestock	Burros	Wildlife
Aguila	5,073	0	1,176	6,145	0	1,731
Alamo	0	240	122	180	240	122
Auza	948	0	108	948	0	108
Babcock	380	0	36	380	0	69
Bar D 4	300	120	108	360	120	108
Bialac	0	0	108	30	0	108
Bodfish	264	0	51	264	0	51
Brown, Buck	732	0	29	732	0	29
Cactus Garden	300	0	12	333	0	16
Cain	72	0	120	72	0	120
Calhoun	503	0	228	855	0	228
Carco	2,330	0	113	2,469	0	218
Carter	59	0	72	59	0	72
Carter Herrera	611	0	15	667	0	15
Central AZ	888	0	180	888	0	180
Coughlin "A"	1,561	0	300	1,754	0	405
Coughlin "B"	168	0	72	168	0	72
Cross Mountain	12	0	33	12	0	33
Date Creek	108	0	18	108	0	18
Desert Hills "A"	393	0	48	393	0	110
Desert Hills "B"	618	60	105	618	60	105
Douglas	1,177	0	432	1,241	0	432
Eagle Eye	0	0	24	0	0	24
Eagle Eye 6Y	137	0	24	137	0	24
Echeverria	713	0	96	920	0	128
Effus	603	0	84	672	0	84
Ekvall	312	60	180	312	60	180
Flat Iron	570	0	72	618	0	72
Foraker	180	0	160	180	0	160
Garcia	768	0	96	840	0	128
Globe	648	0	150	648	0	150
Gordon, R.	144	0	19	144	0	19
Crantham	156	0	75	156	0	75
Hancock	1,483	0	192	1,696	0	348
Harcuvar	2,915	0	432	2,967	0	778
Hassayampa	0	0	288	0	0	288
Hawkins	276	0	24	276	0	24
Heine	24	0	0	24	0	0
Hogue Produce	1,368	0	48	1,368	0	48
James, H.	60	0	12	60	0	12
Jenner	384	0	60	384	0	60
Jones	584	0	120	942	0	120
KMJ	120	0	168	120	0	168
Lamberson	513	0	65	513	0	117
Leidig	1,200	0	180	1,342	0	326
Loma Linda	1,602	0	125	2,166	0	217
Los Caballeros	947	0	96	1,040	0	128
Medd	516	0	88	516	0	88
Moralez	768	0	52	768	0	200
Narramore	374	0	24	398	0	32
Ohaco	1,476	0	336	1,789	0	336
Orosco	546	0	50	729	0	84
Palmerita	924	240	264	1,007	240	440
Park, H.	108	0	6	108	0	6
Park, R.	108	0	24	108	0	24
Park, R. & E.	192	0	24	192	0	24
Peters	6	0	8	6	0	8
Pipeline	1,308	0	120	1,414	0	200
Primrose	0	360	423	120	360	423
Rees	746	0	108	774	0	191
Ridgeway Kong	760	0	120	808	0	160
R. Santa Ynez	360	0	72	360	0	72
Saddle Mountain	212	0	36	217	0	36
Salome Community	233	0	96	386	0	150
Santa Maria	2,337	180	126	2,731	180	211
Satathite	12	0	4	12	0	4
Sitgreaves Red Hill	255	0	48	276	0	48
Sky Arrow	1,056	0	156	1,213	0	278
Sprouse	810	0	72	1,006	0	96
Thompson	144	0	12	144	0	12
Turner	0	0	180	0	0	180
Van Keuren	240	0	84	240	0	84
Vasilius	24	0	18	24	0	18
Wellik	216	0	60	246	0	60
Whitehead	576	0	93	576	0	93
White Tanks	0	0	246	0	0	246
Wickenburg "A"	2,287	0	204	2,559	0	355
Wickenburg "B"	253	0	108	253	0	108
Wilson	0	0	36	0	0	36
Grand Totals	49,051	1,260	9,574	55,181	1,260	12,331

APPENDIX 4 (Continued)
FORAGE ALLOCATION IN AUMS BY ALLOTMENT
Seasonal Grazing

Allotment	Initial			Projected (20 Years)		
	Livestock	Burros	Wildlife	Livestock	Burros	Wildlife
Aguila	5,073	0	1,176	5,940	0	1,731
Alamo	0	240	122	0	240	122
Auza	948	0	108	948	0	108
Babcock	380	0	36	380	0	61
Bar D 4	300	120	108	360	120	108
Bialac	0	0	108	30	0	108
Bodfish	264	0	51	264	0	51
Brown, Buck	732	0	29	732	0	29
Cactus Garden	300	0	12	324	0	16
Cain	72	0	120	72	0	120
Calhoun	503	0	228	803	0	228
Carco	2,330	0	113	2,420	0	218
Carter	59	0	72	59	0	72
Carter Herrera	611	0	15	661	0	15
Central AZ	888	0	180	888	0	180
Coughlin "A"	1,561	0	300	1,698	0	405
Coughlin "B"	168	0	72	168	0	72
Cross Mountain	12	0	33	12	0	33
Date Creek	108	0	18	108	0	18
Desert Hills "A"	393	0	48	393	0	97
Desert Hills "B"	618	60	105	618	60	105
Douglas	1,177	0	432	1,225	0	432
Eagle Eye	0	0	24	0	0	24
Eagle Eye 6Y	137	0	24	137	0	24
Echeverria	713	0	96	903	0	128
Effus	603	0	84	658	0	84
Ekvall	312	60	180	312	60	180
Flat Iron	570	0	72	598	0	72
Foraker	180	0	160	180	0	160
Garcia	768	0	96	814	0	128
Globe	648	0	150	648	0	150
Gordon, R.	144	0	19	144	0	19
Grantham	156	0	75	156	0	75
Hancock	1,483	0	192	1,641	0	348
Harcuvar	2,915	0	432	2,915	0	700
Hassayampa	0	0	288	0	0	288
Hawkins	276	0	24	276	0	24
Heine	24	0	0	24	0	0
Hogue Produce	1,368	0	48	1,368	0	48
James, H.	60	0	12	60	0	12
Jenner	384	0	60	384	0	60
Jones	584	0	120	633	0	120
KMJ	120	0	168	120	0	168
Lamberson	513	0	65	513	0	105
Leidig	1,200	0	180	1,311	0	326
Loma Linda	1,602	0	125	1,648	0	217
Los Caballeros	947	0	96	1,009	0	128
Medd	516	0	88	516	0	88
Moralez	768	0	52	768	0	159
Narramore	374	0	24	394	0	32
Ohaco	1,476	0	336	1,731	0	336
Orosco	546	0	50	699	0	84
Palmerita	924	240	264	976	240	440
Park, H.	108	0	6	108	0	6
Park, R.	108	0	24	108	0	24
Park, R. & E.	192	0	24	192	0	24
Peters	6	0	8	6	0	8
Pipeline	1,308	0	120	1,371	0	200
Primrose	0	360	423	0	360	423
Rees	746	0	108	748	0	191
Ridgeway Kong	760	0	120	782	0	160
R. Santa Ynez	360	0	72	360	0	72
Saddle Mountain	212	0	36	212	0	36
Salome Community	233	0	96	372	0	150
Santa Maria	2,337	180	126	2,648	180	211
Satathite	12	0	4	12	0	4
Sitgreaves Red Hill	255	0	48	255	0	48
Sky Arrow	1,056	0	156	1,067	0	278
Sprouse	810	0	72	986	0	96
Thompson	144	0	12	144	0	12
Turner	0	0	180	0	0	180
Van Keuren	240	0	84	240	0	84
Vasilius	24	0	18	24	0	18
Wellik	216	0	60	238	0	60
Whitehead	576	0	93	576	0	93
White Tanks	0	0	246	0	0	246
Wickenburg "A"	2,287	0	204	2,385	0	355
Wickenburg "B"	253	0	108	253	0	108
Wilson	0	0	36	0	0	36
Grand Totals	49,051	1,260	9,574	52,726	1,260	12,179

APPENDIX 4 (Continued)
FORAGE ALLOCATION IN AUMS BY ALLOTMENT
Ephemeral Option

Allotment	Initial			Projected (20 Years)		
	Livestock	Burros	Wildlife	Livestock	Burros	Wildlife
Aguila	5,073	0	1,176	5,940	0	1,731
Alamo	0	240	122	0	240	122
Auza	948	0	108	948	0	108
Babcock	380	0	36	380	0	61
Bar D 4	300	120	108	360	120	108
Bialac	0	0	108	0	0	108
Bodfish	264	0	51	264	0	51
Brown, Buck	732	0	29	732	0	29
Cactus Garden	300	0	12	324	0	16
Cain	72	0	120	72	0	120
Calhoun	0	0	228	0	0	228
Carco	2,330	0	113	2,420	0	218
Carter	59	0	72	59	0	72
Carter Herrera	0	0	15	0	0	15
Central AZ	888	0	180	888	0	180
Coughlin "A"	1,561	0	300	1,698	0	405
Coughlin "B"	168	0	72	168	0	72
Cross Mountain	12	0	33	12	0	33
Date Creek	108	0	18	108	0	18
Desert Hills "A"	393	0	48	393	0	97
Desert Hills "B"	618	60	105	618	60	105
Douglas	0	0	432	0	0	432
Eagle Eye	0	0	24	0	0	24
Eagle Eye 6Y	137	0	24	137	0	24
Echeverria	713	0	96	903	0	128
Effus	0	0	84	0	0	84
Ekvall	312	60	180	312	60	180
Flat Iron	0	0	72	0	0	72
Foraker	180	0	160	180	0	160
Garcia	768	0	96	814	0	128
Globe	648	0	150	648	0	150
Gordon, R.	144	0	19	144	0	19
Grantham	156	0	75	156	0	75
Hancock	1,483	0	192	1,641	0	348
Harcuvar	2,915	0	432	2,915	0	700
Hassayampa	0	0	288	0	0	288
Hawkins	276	0	24	276	0	24
Heine	24	0	0	24	0	0
Hogue Produce	1,368	0	48	1,368	0	48
James, H.	60	0	12	60	0	12
Jenner	384	0	60	384	0	60
Jones	0	0	120	0	0	120
KMJ	120	0	168	120	0	168
Lamberson	513	0	65	513	0	105
Leidig	1,200	0	180	1,311	0	326
Loma Linda	1,602	0	125	1,648	0	217
Los Caballeros	947	0	96	1,009	0	128
Medd	516	0	88	516	0	88
Moralez	768	0	52	768	0	159
Narramore	374	0	24	394	0	32
Ohaco	1,476	0	336	1,731	0	336
Orosco	546	0	50	699	0	84
Palmerita	924	240	264	976	240	440
Park, H.	108	0	6	108	0	6
Park, R.	108	0	24	108	0	24
Park, R. & E.	192	0	24	192	0	24
Peters	6	0	8	6	0	8
Pipeline	1,308	0	120	1,371	0	200
Primrose	0	360	423	0	360	423
Rees	746	0	108	748	0	191
Ridgeway Kong	760	0	120	782	0	160
R. Santa Ynez	360	0	72	360	0	72
Saddle Mountain	0	0	36	0	0	36
Salome Community	233	0	96	372	0	150
Santa Maria	2,337	180	126	2,648	180	211
Satathite	12	0	4	12	0	4
Sitgreaves Red Hill	0	0	48	0	0	48
Sky Arrow	1,056	0	156	1,067	0	278
Sprouse	810	0	72	986	0	96
Thompson	144	0	12	144	0	12
Turner	0	0	180	0	0	180
Van Keuren	240	0	84	240	0	84
Vasilius	24	0	18	24	0	18
Wellik	216	0	60	238	0	60
Whitehead	576	0	93	576	0	93
White Tanks	0	0	246	0	0	246
Wickenburg "A"	2,287	0	204	2,385	0	355
Wickenburg "B"	253	0	108	253	0	108
Wilson	0	0	36	0	0	36
Grand Totals	44,536	1,260	9,574	47,651	1,260	12,179

APPENDIX 4 (Continued)
FORAGE ALLOCATION IN AUMS BY ALLOTMENT
No Livestock

Allotment	Initial			Projected (20 Years)		
	Livestock	Burros	Wildlife	Livestock	Burros	Wildlife
Aguila	0	0	1,176	0	0	2,586
Alamo	0	420	122	0	420	122
Auza	0	0	108	0	0	108
Babcock	0	0	36	0	0	200
Bar D 4	0	180	108	0	180	108
Bialac	0	0	108	0	0	108
Bodfish	0	0	51	0	0	51
Brown, Buck	0	0	29	0	0	29
Cactus Carden	0	0	12	0	0	24
Cain	0	0	120	0	0	120
Calhoun	0	0	228	0	0	228
Carco	0	0	113	0	0	327
Carter	0	0	72	0	0	72
Carter Herrera	0	0	15	0	0	15
Central AZ	0	0	180	0	0	180
Coughlin "A"	0	0	300	0	0	607
Coughlin "B"	0	0	72	0	0	72
Cross Mountain	0	0	33	0	0	33
Date Creek	0	0	18	0	0	18
Desert Hills "A"	0	0	48	0	0	244
Desert Hills "B"	0	60	105	0	60	105
Douglas	0	0	432	0	0	432
Eagle Eye	0	0	24	0	0	24
Eagle Eye 6Y	0	0	24	0	0	24
Echeverria	0	0	96	0	0	192
Effus	0	0	84	0	0	84
Ekvall	0	160	180	0	160	180
Flat Iron	0	0	72	0	0	72
Foraker	0	0	160	0	0	160
Garcia	0	0	96	0	0	192
Globe	0	0	150	0	0	150
Gordon, R.	0	0	19	0	0	19
Crantham	0	0	75	0	0	75
Hancock	0	0	192	0	0	522
Harcuvar	0	0	432	0	0	1,167
Hassayampa	0	0	288	0	0	288
Hawkins	0	0	24	0	0	24
Heine	0	0	0	0	0	0
Hogue Produce	0	0	48	0	0	48
James, H.	0	0	12	0	0	12
Jenner	0	0	60	0	0	60
Jones	0	0	120	0	0	120
KMJ	0	0	168	0	0	168
Lamberson	0	0	65	0	0	175
Leidig	0	0	180	0	0	490
Loma Linda	0	0	125	0	0	326
Los Caballeros	0	0	96	0	0	192
Medd	0	0	88	0	0	88
Moralez	0	0	52	0	0	382
Narramore	0	0	24	0	0	48
Ohaco	0	0	336	0	0	336
Orosco	0	0	50	0	0	125
Palmerita	0	360	264	0	360	660
Park, H.	0	0	6	0	0	6
Park, R.	0	0	24	0	0	24
Park, R. & E.	0	0	24	0	0	108
Peters	0	0	8	0	0	8
Pipeline	0	0	120	0	0	301
Primrose	0	480	423	0	480	423
Rees	0	0	108	0	0	287
Ridgeway Kong	0	0	120	0	0	240
R. Santa Ynez	0	0	72	0	0	72
Saddle Mountain	0	0	36	0	0	36
Salome Community	0	0	96	0	0	223
Santa Maria	0	200	126	0	200	317
Satathite	0	0	4	0	0	4
Sitgreaves Red Hill	0	0	48	0	0	48
Sky Arrow	0	0	156	0	0	417
Sprouse	0	0	72	0	0	144
Thompson	0	0	12	0	0	12
Turner	0	0	180	0	0	180
Van Keuren	0	0	84	0	0	84
Vasilius	0	0	18	0	0	18
Wellik	0	0	60	0	0	60
Whitehead	0	0	93	0	0	93
White Tanks	0	0	246	0	0	246
Wickenburg "A"	0	0	204	0	0	533
Wickenburg "B"	0	0	108	0	0	108
Wilson	0	0	36	0	0	36
Grand Totals	0	1,860	9,574	0	1,860	16,220

APPENDIX 5
LIVESTOCK GRAZING SUMMARY BY ALLOTMENT

Allotment	Authorized Grazing Preference	Average Licensed Use 1976-1980	Proposed Action		No Action		Intensive Grazing		Seasonal Grazing		Ephemeral Option		No Livestock	
			Livestock AUMs	% Change From Preference	Livestock AUMs	% Change From Preference	Livestock AUMs	% Change From Preference	Livestock AUMs	% Change From Preference	Livestock AUMs	% Change From Preference	Livestock AUMs	% Change From Preference
Aguila	5,073	5,073	5,073	0	5,073	0	5,073	0	5,073	0	5,073	0	0	-100
Alamo	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Auza	948	948	948	0	948	0	948	0	948	0	948	0	0	-100
Babcock	380	380	380	0	380	0	380	0	380	0	380	0	0	-100
Bar D 4	300	300	300	0	300	0	300	0	300	0	300	0	0	-100
Bialac	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bodfish	264	264	264	0	264	0	264	0	264	0	264	0	0	-100
Brown, Buck	732	732	732	0	732	0	732	0	732	0	732	0	0	-100
Cactus Carden	74	300	300	+305	74	0	300	+305	300	+305	300	+305	0	-100
Cain	72	72	72	0	72	0	72	0	72	0	72	0	0	-100
Calhoun	2,304	503	503	- 78	2,304	0	503	- 78	503	- 78	0	-100	0	-100
Carco	2,330	2,330	2,330	0	2,330	0	2,330	0	2,330	0	2,330	0	0	-100
Carter	59	59	59	0	59	0	59	0	59	0	59	0	0	-100
Carter Herrera	611	611	611	0	611	0	611	0	611	0	0	-100	0	-100
Central AZ	888	888	888	0	888	0	888	0	888	0	888	0	0	-100
Coughlin "A"	3,096	1,561	1,561	- 50	3,096	0	1,561	- 50	1,561	- 50	1,561	- 50	0	-100
Coughlin "B"	168	168	168	0	168	0	168	0	168	0	168	0	0	-100
Cross Mountain	12	12	12	0	12	0	12	0	12	0	12	0	0	-100
Date Creek	108	108	108	0	108	0	108	0	108	0	108	0	0	-100
Desert Hills "A"	398	393	393	- 1	398	0	393	- 1	393	- 1	393	- 1	0	-100
Desert Hills "B"	618	618	618	0	618	0	618	0	618	0	618	0	0	-100
Douglas	1,722	1,177	1,177	- 32	1,722	0	1,177	- 32	1,177	- 32	0	-100	0	-100
Eagle Eye	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eagle Eye 6Y	228	137	137	- 40	228	0	137	- 40	137	- 40	137	- 40	0	-100
Echeverria	713	713	713	0	713	0	713	0	713	0	713	0	0	-100
Effus	1,155	603	603	- 48	1,155	0	603	- 48	603	- 48	0	-100	0	-100
Ekvall	312	312	312	0	312	0	312	0	312	0	312	0	0	-100
Flat Iron	900	570	570	- 37	900	0	570	- 37	570	- 37	0	-100	0	-100
Foraker	180	180	180	0	180	0	180	0	180	0	180	0	0	-100
Garcia	769	769	769	0	769	0	769	0	769	0	769	0	0	-100
Globe	648	648	648	0	648	0	648	0	648	0	648	0	0	-100
Gordon, R.	144	144	144	0	144	0	144	0	144	0	144	0	0	-100
Grantham	156	156	156	0	156	0	156	0	156	0	156	0	0	-100
Hancock	1,620	1,483	1,483	- 8	1,620	0	1,483	- 8	1,483	- 8	1,483	- 8	0	-100
Harcuvar	5,292	2,915	2,915	- 45	5,292	0	2,915	- 45	2,915	- 45	2,915	- 45	0	-100
Hassayampa	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hawkins	276	276	276	0	276	0	276	0	276	0	276	0	0	-100
Heine	24	24	24	0	24	0	24	0	24	0	24	0	0	-100
Hogue Produce	1,368	1,368	1,368	0	1,368	0	1,368	0	1,368	0	1,368	0	0	-100
James H.	60	60	60	0	60	0	60	0	60	0	60	0	0	-100

APPENDIX 5 (Continued)
LIVESTOCK GRAZING SUMMARY BY ALLOTMENT

Allotment	Authorized Grazing Preference	Average Licensed Use 1976-1980	Proposed Action		No Action		Intensive Grazing		Seasonal Grazing		Ephemeral Option		No Livestock	
			Livestock AUMs	% Change From Preference	Livestock AUMs	% Change From Preference	Livestock AUMs	% Change From Preference	Livestock AUMs	% Change From Preference	Livestock AUMs	% Change From Preference	Livestock AUMs	% Change From Preference
Jenner	384	384	384	0	384	0	384	0	384	0	384	0	0	-100
Jones	900	584	584	- 35	900	0	584	- 35	584	- 35	0	-100	0	-100
KMJ	120	120	120	0	120	0	120	0	120	0	120	0	0	-100
Lamberson	513	513	513	0	513	0	513	0	513	0	0	0	0	-100
Leidig	1,200	0	1,200	0	1,200	0	1,200	0	1,200	0	1,200	0	0	-100
Loma Linda	1,602	534	1,602	0	1,602	0	1,602	0	1,602	0	1,602	0	0	-100
Los Caballeros	977	947	947	- 3	977	0	947	- 3	947	- 3	947	- 3	0	-100
Medd	516	516	516	0	516	0	516	0	516	0	516	0	0	-100
Moralez	768	768	768	0	768	0	768	0	768	0	768	0	0	-100
Narramore	468	374	374	- 20	468	0	374	- 20	374	- 20	374	- 20	0	-100
Ohaco	1,476	1,476	1,476	0	1,476	0	1,476	0	1,476	0	1,476	0	0	-100
Orosco	546	102	546	0	546	0	546	0	546	0	546	0	0	-100
Palmerita	924	924	924	0	924	0	924	0	924	0	924	0	0	-100
Park, H.	108	108	108	0	108	0	108	0	108	0	108	0	0	-100
Park, R.	108	108	108	0	108	0	108	0	108	0	108	0	0	-100
Park, R. & E.	192	192	192	0	192	0	192	0	192	0	192	0	0	-100
Peters	6	6	6	0	6	0	6	0	6	0	6	0	0	-100
Pipeline	1,267	1,308	1,308	+ 3	1,267	0	1,308	+ 3	1,308	+ 3	1,308	+ 3	0	-100
Primrose	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rees	1,068	746	746	- 30	1,068	0	746	- 30	746	- 30	746	- 30	0	-100
Ridgeway Kong	1,007	760	760	- 25	1,007	0	760	- 25	760	- 25	760	- 25	0	-100
R. Santa Ynez	360	360	360	0	360	0	360	0	360	0	360	0	0	-100
Saddle Mountain	552	212	212	- 62	552	0	212	- 62	212	- 62	0	-100	0	-100
Salome Community	247	233	233	- 6	247	0	233	- 6	233	- 6	233	- 6	0	-100
Santa Maria	2,337	2,337	2,337	0	2,337	0	2,337	0	2,337	0	2,337	0	0	-100
Satathite	12	12	12	0	12	0	12	0	12	0	12	0	0	-100
Sitgreaves Red Hill	680	255	255	- 63	680	0	255	- 63	255	- 63	0	-100	0	-100
Sky Arrow	1,056	1,056	1,056	0	1,056	0	1,056	0	1,056	0	1,056	0	0	-100
Sprouse	810	810	810	0	810	0	810	0	810	0	810	0	0	-100
Thompson	144	144	144	0	144	0	144	0	144	0	144	0	0	-100
Turner	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Van Keuren	240	240	240	0	240	0	240	0	240	0	240	0	0	-100
Vasilius	24	24	24	0	24	0	24	0	24	0	24	0	0	-100
Wellik	216	216	216	0	216	0	216	0	216	0	216	0	0	-100
Whitehead	576	576	576	0	576	0	576	0	576	0	576	0	0	-100
White Tanks	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wickenburg "A"	2,496	2,287	2,287	- 8	2,496	0	2,287	- 8	2,287	- 8	2,287	- 8	0	-100
Wickenburg "B"	253	253	253	0	253	0	253	0	253	0	253	0	0	-100
Wilson	0	0	0	0	0	0	0	0	0	0	0	0	0	0

APPENDIX 6
LONG-TERM IMPACTS TO RANGELAND CONDITION

Allotment Name	Proposed Action	No Action	Intensive Grazing	Seasonal Grazing	Ephemeral Option	No Grazing
Aguila	Improve	Static	Improve	Improve	Improve	Improve
Alamo	Static	Static	Static	Static	Static	Improve
Auza	Decline	Decline	Decline	Decline	Decline	Improve
Babcock	Improve	Static	Improve	Improve	Improve	Improve
Bar D 4	Static	Static	Static	Static	Static	Improve
Bialac	Static	Static	Static	Static	Static	Improve
Bodfish	Static	Static	Static	Static	Static	Improve
Brown, Buck	Static	Static	Static	Static	Static	Improve
Cactus Garden	Improve	Improve	Improve	Improve	Improve	Improve
Cain	Static	Static	Static	Static	Static	Improve
Calhoun	Static	Static	Improve	Improve	Improve	Improve
Carco	Improve	Improve	Improve	Improve	Improve	Improve
Carter	Improve	Improve	Improve	Improve	Improve	Improve
Carter Herrera	Static	Static	Improve	Improve	Improve	Improve
Central AZ	Static	Static	Static	Static	Static	Improve
Coughlin "A"	Improve	Improve	Improve	Improve	Improve	Improve
Coughlin "B"	Improve	Improve	Improve	Improve	Improve	Improve
Cross Mountain	Static	Static	Static	Static	Static	Improve
Date Creek	Decline	Decline	Decline	Decline	Decline	Improve
Desert Hills "A"	Static	Static	Improve	Improve	Improve	Improve
Desert Hills "B"	Static	Static	Static	Static	Static	Improve
Douglas	Improve	Improve	Improve	Improve	Improve	Improve
Eagle Eye	Static	Static	Static	Static	Static	Improve
Eagle Eye 6Y	Decline	Decline	Improve	Improve	Improve	Improve
Echeverria	Static	Static	Improve	Improve	Improve	Improve
Effus	Decline	Decline	Improve	Improve	Improve	Improve
Ekvall	Improve	Improve	Improve	Improve	Improve	Improve
Flat Iron	Static	Static	Improve	Improve	Improve	Improve
Foraker	Improve	Improve	Improve	Improve	Improve	Improve
Garcia	Improve	Improve	Improve	Improve	Improve	Improve
Globe	Improve	Improve	Improve	Improve	Improve	Improve
Gordon, R.	Improve	Improve	Improve	Improve	Improve	Improve
Grantham	Static	Static	Static	Static	Static	Improve
Hancock	Static	Static	Improve	Improve	Improve	Improve
Harcuvar	Static	Static	Improve	Improve	Improve	Improve
Hassayampa	Static	Static	Static	Static	Static	Improve
Hawkins	Static	Static	Static	Static	Static	Improve
Heine	Static	Static	Static	Static	Static	Improve
Hogue Produce	Static	Static	Static	Static	Static	Improve
James, H.	Decline	Decline	Decline	Decline	Decline	Improve
Jenner	Decline	Decline	Decline	Decline	Decline	Improve
Jones	Decline	Decline	Improve	Improve	Improve	Improve
KMJ	Static	Static	Static	Static	Static	Improve
Lamberson	Static	Static	Improve	Improve	Improve	Improve
Leidig	Static	Static	Improve	Improve	Improve	Improve
Loma Linda	Improve	Static	Improve	Improve	Improve	Improve
Los Caballeros	Improve	Improve	Improve	Improve	Improve	Improve
Medd	Improve	Improve	Improve	Improve	Improve	Improve
Moralez	Improve	Improve	Improve	Improve	Improve	Improve
Narramore	Static	Static	Improve	Improve	Improve	Improve
Ohaco	Static	Static	Improve	Improve	Improve	Improve
Orosco	Improve	Static	Improve	Improve	Improve	Improve
Palmerita	Static	Static	Improve	Improve	Improve	Improve
Park, H.	Static	Static	Static	Static	Static	Improve
Park, R.	Static	Static	Static	Static	Static	Improve
Park, R. & E.	Decline	Decline	Decline	Decline	Decline	Improve
Peters	Static	Static	Static	Static	Static	Improve
Pipeline	Improve	Improve	Improve	Improve	Improve	Improve
Primrose	Static	Static	Static	Static	Static	Improve
Rees	Improve	Improve	Improve	Improve	Improve	Improve
Ridgeway Kong	Improve	Improve	Improve	Improve	Improve	Improve
R. Santa Ynez	Decline	Decline	Decline	Decline	Decline	Improve
Saddle Mountain	Static	Static	Improve	Improve	Improve	Improve
Salome Community	Static	Static	Improve	Improve	Improve	Improve
Santa Maria	Improve	Static	Improve	Improve	Improve	Improve
Satathite	Static	Static	Static	Static	Static	Improve
Sitgreaves Red Hill	Static	Static	Improve	Improve	Improve	Improve
Sky Arrow	Improve	Static	Improve	Improve	Improve	Improve
Sprouse	Improve	Improve	Improve	Improve	Improve	Improve
Thompson	Improve	Improve	Improve	Improve	Improve	Improve
Turner	Static	Static	Static	Static	Static	Improve
Van Keuren	Static	Static	Static	Static	Static	Improve
Vasilius	Improve	Improve	Improve	Improve	Improve	Improve
Wellik	Decline	Decline	Decline	Decline	Decline	Improve
Whitehead	Improve	Improve	Improve	Improve	Improve	Improve
White Tanks	NA	NA	NA	NA	NA	NA
Wickenburg "A"	Improve	Static	Improve	Improve	Improve	Improve
Wickenburg "B"	Static	Static	Static	Static	Static	Improve
Wilson	Static	Static	Static	Static	Static	Improve

NA = Not Available.

APPENDIX 7
EXISTING RANGELAND DEVELOPMENTS BY ALLOTMENT

Allotment Name	Reservoirs	Spring Developments	Wells	Pipeline (Miles)	Fence (Miles)	Cattle Guards
Aguila	20	1	15	3	40	--
Alamo	1	1	2	--	16	--
Auza	2	--	--	--	5	--
Babcock	3	--	1	--	30	--
Bar D 4	1	--	--	3	13	--
Bialac	1	--	2	--	12	--
Bodfish	--	--	1	--	5	--
Brown, Buck	--	1	--	--	12	--
Cactus Garden	--	--	2	4	--	--
Cain	--	--	1	--	--	--
Calhoun	--	--	2	--	6	--
Carco	17	--	4	7	--	--
Carter	--	--	--	--	--	--
Carter Herrera	6	--	2	--	36	--
Central AZ	13	--	1	6	41	--
Coughlin "A"	18	4	7	4	4	--
Coughlin "B"	--	1	--	--	--	--
Cross Mountain	--	--	--	--	--	--
Date Creek	11	1	2	--	--	--
Desert Hills "A"	1	2	1	--	--	--
Desert Hills "B"	--	--	--	--	--	--
Douglas	26	--	10	--	< 1	--
Eagle Eye	--	--	--	--	--	--
Eagle Eye 6Y	--	--	--	--	--	--
Echeverria	--	--	2	--	3	--
Effus	10	--	4	9	14	--
Ekvall	--	--	--	--	3	--
Flat Iron	4	--	3	3	--	--
Foraker	--	--	1	--	--	--
Garcia	3	--	2	--	4	--
Globe	2	--	2	1	18	--
Gordon, R.	--	--	--	--	3	--
Grantham	1	--	--	--	15	--
Hancock	3	--	4	1	22	--
Harcuvar	11	1	6	--	--	--
Hassayampa	--	--	5	--	--	--
Hawkins	--	--	--	--	5	--
Heine	--	--	--	--	--	--
Hogue Produce	1	--	--	--	23	--
James, H.	--	--	--	--	--	--
Jenner	--	--	1	--	3	--
Jones	3	--	1	--	--	--
KMJ	--	--	--	--	3	--
Lamberson	4	--	3	--	8	--
Leid'g	2	--	3	--	8	--
Loma Linda	--	--	7	14	8	--
Los Caballeros	5	--	5	--	17	--
Medd	--	--	--	4	6	--
Moralez	--	--	2	--	10	--
Narramore	11	--	1	--	23	--
Ohaco	12	--	7	--	41	--
Orosco	2	--	--	--	--	--
Palmerita	3	--	7	< 1	44	--
Psrk, H.	--	--	--	--	--	--
Park, R.	--	--	--	--	--	--
Park, R. & E.	--	--	--	--	--	--
Peters	1	--	2	--	--	--
Pipeline	12	1	1	20	7	4
Primrose	5	--	3	--	25	--
Rees	3	--	4	--	5	--
Ridgeway Kong	5	--	4	--	9	--
R. Santa Ynez	1	--	--	--	9	--
Saddle Mountain	2	--	1	--	13	2
Salome Community	--	--	--	--	--	--
Santa Maria	3	9	3	--	35	--
Satathite	--	--	--	--	--	--
Sitgreaves Red Hill	4	--	--	--	25	2
Sky Arrow	2	--	2	--	20	--
Sprouse	1	--	7	--	9	--
Thompson	--	--	--	--	--	--
Turner	3	--	4	4	13	--
Van Keuren	--	1	--	--	< 1	--
Vasilius	--	--	--	--	--	--
Wellik	9	--	--	3	6	--
Whitehead	--	--	--	--	8	--
White Tanks	--	--	--	--	--	--
Wickenburg "A"	--	--	7	--	17	--
Wickenburg "B"	--	--	--	--	--	--
Wilson	1	--	2	--	--	--

APPENDIX 8
RANGELAND DEVELOPMENT SUMMARY BY ALLOTMENT
(Proposed Action)

Allotment	Development Type	Unit	Approximate Cost (1981 Dollars)	Acres Disturbed Short Term	Acres Disturbed Long Term
Aguila	Fence	20.0 mi.	$82,000	10.0	2.0
Alamo	—	—	—	—	—
Auza	—	—	—	—	—
Babcock	—	—	—	—	—
Bar D 4	—	—	—	—	—
Bialac	—	—	—	—	—
Bodfish	—	—	—	—	—
Brown, Buck	—	—	—	—	—
Cactus Garden	—	—	—	—	—
Cain	—	—	—	—	—
Calhoun	—	—	—	—	—
Carco	Well	1	13,300	0.25	0.08
	Fence	3.0 mi.	12,300	1.5	0.3
Carter	—	—	—	—	—
Carter Herrera	—	—	—	—	—
Central AZ	—	—	—	—	—
Coughlin "A"	Fence	6.0 mi.	24,600	3.0	0.6
Coughlin "B"	—	—	—	—	—
Cross Mountain	—	—	—	—	—
Date Creek	—	—	—	—	—
Desert Hills "A"	—	—	—	—	—
Desert Hills "B"	—	—	—	—	—
Douglas	—	—	—	—	—
Eagle Eye	—	—	—	—	—
Eagle Eye 6Y	—	—	—	—	—
Echeverria	—	—	—	—	—
Effus	—	—	—	—	—
Ekvall	—	—	—	—	—
Flat Iron	—	—	—	—	—
Foraker	—	—	—	—	—
Garcia	—	—	—	—	—
Globe	—	—	—	—	—
Gordon, R.	—	—	—	—	—
Grantham	—	—	—	—	—
Hancock	—	—	—	—	—
Harcuvar	—	—	—	—	—
Hassayampa	—	—	—	—	—
Hawkins	—	—	—	—	—
Heine	—	—	—	—	—
Hogue Produce	—	—	—	—	—
James, H.	—	—	—	—	—
Jenner	—	—	—	—	—
Jones	—	—	—	—	—
KMJ	—	—	—	—	—
Lamberson	—	—	—	—	—
Leidig	—	—	—	—	—
Loma Linda	Well	1	$13,300	0.25	0.08
	Pipeline	2.0 mi.	16,000	2.0	0.67
	Fence	5.0 mi.	20,500	2.5	0.5
Los Caballeros	—	—	—	—	—
Medd	—	—	—	—	—
Moralez	—	—	—	—	—
Narramore	—	—	—	—	—
Ohaco	—	—	—	—	—
Orosco	Well	1	13,300	0.25	0.08
Palmerita	—	—	—	—	—
Park, H.	—	—	—	—	—
Park, R.	—	—	—	—	—
Park, R. & E.	—	—	—	—	—
Peters	—	—	—	—	—
Pipeline	—	—	—	—	—
Primrose	—	—	—	—	—
Rees	—	—	—	—	—
Ridgeway Kong	—	—	—	—	—
R. Santa Ynez	—	—	—	—	—
Saddle Mountain	—	—	—	—	—
Salome Community	—	—	—	—	—
Santa Maria	Fence	4.0 mi.	16,400	2.0	0.4
Satathite	—	—	—	—	—
Sitgreaves Red Hill	—	—	—	—	—
Sky Arrow	Well	1	13,300	0.25	0.08
	Fence	3.0 mi.	12,300	1.5	0.3
Sprouse	—	—	—	—	—
Thompson	—	—	—	—	—
Turner	—	—	—	—	—
Van Keuren	—	—	—	—	—
Vasilius	—	—	—	—	—
Wellik	—	—	—	—	—
Whitehead	—	—	—	—	—
White Tanks	—	—	—	—	—
Wickenburg "A"	Spring Development	3	3,600	0.75	0.26
	Well	1	13,300	0.25	0.08
	Fence	4.0 mi.	16,400	2.0	0.4
Wickenburg "B"	—	—	—	—	—
Wilson	—	—	—	—	—

APPENDIX 8 (Continued)
RANGELAND DEVELOPMENT SUMMARY BY ALLOTMENT
(Intensive Grazing)

Allotment	Development Type	Unit	Approximate Cost (1981 Dollars)	Acres Disturbed Short Term	Acres Disturbed Long Term
Aguila	Spring Development	2	$ 2,400	0.5	0.18
	Well	1	13,300	0.25	0.08
	Fence	20.0 mi.	82,000	10.0	2.0
Alamo	—	—	—	—	—
Auza	—		—	—	—
Babcock	Reservoir	2	10,000	2.0	1.6
Bar D 4	—	—	—	—	—
Bialac	Well	1	13,300	0.25	0.08
Bodfish	—	—	—	—	—
Brown, Buck	—	—	—	—	--
Cactus Garden	Well	1	13,300	0.25	0.08
Cain	—	—	—	—	—
Calhoun	Well	2	26,600	0.5	0.15
Carco	Well	1	13,300	0.25	0.08
	Fence	3.0 mi.	12,300	1.5	0.3
Carter	—	—	—	—	—
Carter Herrera	Fence	1.0 mi.	4,100	0.5	0.1
Central AZ	—	—	—	—	—
Coughlin "A"	Well	3	39,900	0.75	0.23
Coughlin "B"	—	—	—	—	—
Cross Mountain	—	—	—	—	—
Date Creek	—	—	—	—	—
Desert Hills "A"	Well	1	13,300	0.25	0.08
Desert Hills "B"	—	—	—	—	—
Douglas	—	—	—	—	--
Eagle Eye	Well	1	13,300	0.25	0.08
Eagle Eye 6Y	—	—	—	—	—
Echeverria	Well	2	26,600	0.5	0.15
Effus	Pipeline	1.5 mi.	12,000	1.5	0.49
	Fence	3.0 mi.	12,300	1.5	0.3
Ekvall	—	—	—	—	—
Flat Iron	—	—	—	—	—
Foraker	Well	1	13,300	0.25	0.08
Garcia	Well	3	39,900	0.75	0.23
Globe	—	—	—	—	—
Gordon, R.	—	—	—	—	--
Grantham	—	—	—	—	--
Hancock	Reservoir	4	40,000	8.0	6.4
	Spring Development	1	1,200	0.25	0.09
	Well	2	26,600	0.5	0.15
	Fence	12.0 mi.	49,200	6.0	1.2
Harcuvar	Reservoir	4	40,000	8.0	6.4
	Spring Development	2	2,400	0.5	0.18
	Well	1	13,300	0.25	0.08
	Pipeline	4.0 mi.	32,000	4.0	1.33
	Fence	14.0 mi.	57,400	7.0	1.4
Hassayampa	Well	1	13,300	0.25	0.08
Hawkins	—	—	—	—	—
Heine	—	—	—	—	—
Hogue Produce	—	—	—	—	—
James, H.	—	—	—	—	—
Jenner	—	—	—	—	—
Jones	—	—	—	—	—
KMJ	—	—	—	—	—

Allotment	Development Type	Unit	Approximate Cost (1981 Dollars)	Acres Disturbed Short Term	Acres Disturbed Long Term
Lamberson	Reservoir	2	$20,000	4.0	3.2
	Spring Development	2	2,400	0.5	0.18
	Pipeline	2.0 mi.	16,000	2.0	0.67
	Fence	5.0 mi.	20,500	2.5	0.5
Leidig	Reservoir	6	60,000	12.0	9.6
	Well	2	26,600	0.5	0.15
	Fence	8.0 mi.	32,800	4.0	0.8
Loma Linda	Well	1	13,300	0.25	0.08
	Pipeline	2.0 mi.	16,000	2.0	0.67
	Fence	5.0 mi.	20,500	2.5	0.5
Los Caballeros	Well	3	39,900	0.75	0.23
	Fence	3.5 mi.	14,350	1.75	0.35
Medd	—	—	—	—	—
Moralez	Spring Development	3	36,000	0.75	0.25
	Fence	5.0 mi.	20,500	2.5	0.5
Narramore	Well	1	13,300	0.25	0.08
Ohaco	Well	2	26,600	0.5	0.15
	Fence	8.0 mi.	32,800	4.0	0.8
Orosco	Reservoir	2	20,000	4.0	3.2
Palmerita	Well	1	13,300	0.25	0.15
	Fence	12.0 mi.	49,200	6.0	1.2
Park, H.	—	—	—	—	—
Park, R.	—	—	—	—	--
Park, R. & E.	—	—	—	—	—
Peters	—	—	—	—	--
Pipeline	—	—	—	—	—
Primrose	—	—	—	—	--
Rees	Reservoir	1	10,000	2.0	1.6
	Well	1	13,300	0.25	0.08
	Fence	9.0 mi.	36,900	4.5	0.9
Ridgeway Kong	Reservoir	1	10,000	2.0	1.6
	Well	2	26,600	0.5	0.15
R. Santa Ynez	—	—	—	—	—
Saddle Mountain	—	—	—	—	—
Salome Community	Reservoir	1	10,000	2.0	1.6
	Fence	1.5 mi.	6,150	0.75	0.15
Santa Maria	Well	3	39,900	0.75	0.23
	Fence	4.0 mi.	16,400	2.0	0.4
Satathite	—	—	—	—	—
Sitgreaves Red Hill	—	—	—	—	—
Sky Arrow	Well	1	13,300	0.25	0.08
	Fence	3.0 mi.	12,300	1.5	0.3
Sprouse	Well	1	13,300	0.25	0.08
	Fence	4.0 mi.	16,400	2.0	0.4
Thompson	—	—	—	—	—
Turner	Well	1	13,300	0.25	0.08
Van Keuren	—	—	—	—	—
Vasilius	—	—	—	—	—
Wellik	—	—	—	—	—
Whitehead	—	—	—	—	—
White Tanks	—	—	—	—	—
Wickenburg "A"	Well	1	13,300	0.25	0.08
	Fence	4.0 mi.	16,400	2.0	0.4
Wickenburg "B"	—	—	—	—	—
Wilson	—	—	—	—	—

APPENDIX 8 (Continued)
RANGELAND DEVELOPMENT SUMMARY BY ALLOTMENT
(Seasonal Grazing)

Allotment	Development Type	Unit	Approximate Cost (1981 Dollars)	Acres Disturbed Short Term	Acres Disturbed Long Term
Aguila	Spring Development	2	$ 2,400	0.5	0.18
	Well	2	26,600	0.5	0.15
Alamo	—	—	—	—	—
Auza	—	—	—	—	—
Babcock	—	—	—	—	—
Bar D 4	—	—	—	—	—
Bialac	—	—	—	—	—
Bodfish	—	—	—	—	—
Brown, Buck	—	—	—	—	—
Cactus Garden	—	—	—	—	—
Cain	—	—	—	—	—
Calhoun	—	—	—	—	—
Carco	Well	2	26,600	0.5	0.15
Carter	—	—	—	—	—
Carter Herrera	—	—	—	—	—
Central AZ	—	—	—	—	—
Coughlin "A"	—	—	—	—	—
Coughlin "B"	—	—	—	—	—
Cross Mountain	—	—	—	—	—
Date Creek	—	—	—	—	—
Desert Hills "A"	—	—	—	—	—
Desert Hills "B"	—	—	—	—	—
Douglas*	Well	1	13,300	0.25	0.08
Eagle Eye	—	—	—	—	—
Eagle Eye 6Y	—	—	—	—	—
Echeverria	Well	1	13,300	0.25	0.08
Effus*	Pipeline	1.0 mi.	8,000	1.0	0.33
Ekvall	—	—	—	—	—
Flat Iron	—	—	—	—	—
Foraker	—	—	—	—	—
Garcia	Well	1	13,300	0.25	0.08
Globe	—	—	—	—	—
Cordon, R.	—	—	—	—	—
Grantham	—	—	—	—	—
Hancock	Well	1	13,300	0.25	0.08
	Spring Development	1	1,200	0.25	0.09
Harcuvar	Well	1	13,300	0.25	0.08
	Spring Development	1	1,200	0.25	0.09
	Pipeline	4.0 mi.	32,000	4.0	1.33
Hassayampa	—	—	—	—	—
Hawkins	—	—	—	—	—
Heine	—	—	—	—	—
Hogue Produce	—	—	—	—	—
James, H.	—	—	—	—	—
Jenner	—	—	—	—	—
Jones	—	—	—	—	—
KMJ	—	—	—	—	—
Lamberson	—	—	—	—	—
Leidig	Well —	1	$13,300	0.25	0.08
Loma Linda	Well	1	13,300	0.25	0.08
	Pipeline	2.0 mi.	16,000	2.0	0.67
Los Caballeros	Well	1	13,300	0.25	0.08
Medd	—	—	—	—	—
Moralez	Spring Development	3	3,600	0.75	0.25
Narramore	—	—	—	—	—
Ohaco	Well	2	26,600	0.5	0.15
Orosco	—	—	—	—	—
Palmerita	Well	1	13,300	0.25	0.08
Park, H.	—	—	—	—	—
Park, R.	—	—	—	—	—
Park, R. & E.	—	—	—	—	—
Peters	—	—	—	—	—
Pipeline	—	—	—	—	—
Primrose	—	—	—	—	—
Rees	Well	1	13,300	0.25	0.08
Ridgeway Kong	Well	1	13,300	0.25	0.08
R. Santa Ynez	—	—	—	—	—
Saddle Mountain	—	—	—	—	—
Salome Community	—	—	—	—	—
Santa Maria	Well	3	39,900	0.75	0.23
Satathite	—	—	—	—	—
Sitgreaves Red Hill	—	—	—	—	—
Sky Arrow	Well	1	13,300	0.25	0.08
Sprouse	Well	1	13,300	0.25	0.08
Thompson	—	—	—	—	—
Turner	—	—	—	—	—
Van Keuren	—	—	—	—	—
Vasilius	—	—	—	—	—
Wellik	—	—	—	—	—
Whitehead	—	—	—	—	—
White Tanks	—	—	—	—	—
Wickenburg "A"	Well	1	13,300	0.25	0.08
Wickenburg "B"	—	—	—	—	—
Wilson	—	—	—	—	—

* Under the Ephemeral Option, no new rangeland improvements are proposed on these allotments.

APPENDIX 9
SOIL SERIES CLASSIFIED ACCORDING TO CURRENT SYSTEM OF CLASSIFICATION

Series	Family	Subgroup	Order
Aco	Coarse-Loamy, Mixed (Calcareous) Hyperthermic	Typic Torriorthents	Entisols
Avondale	Fine-Loamy, Mixed (Calcareous) Hyperthermic	Typic Torriorthents	Entisols
Balon	Fine-Loamy, Mixed, Mesic	Ustollic Haplargids	Aridisols
Barkerville	Sandy-Skeletal, Mixed, Mesic	Typic Ustorents	Entisols
Brios	Sandy, Mixed, Hyperthermic	Typic Torrifluvents	Entisols
Cabezon	Clayey, Montmorillonitic, Mesic	Lithic Argiustolls	Mollisols
Carefree	Fine, Mixed, Hyperthermic	Vertic Haplargids	Aridisols
Carrizo	Sandy-Skeletal, Mixed, Hyperthermic	Typic Torriorthents	Entisols
Casa Grande	Fine-Loamy, Mixed, Hyperthermic	Typic Natragids	Aridisols
Cave	Loamy, Mixed, Thermic, Shallow	Typic Paleorthids	Aridisols
Cavelt	Loamy, Mixed, Hyper-thermic, Shallow	Typic Paleorthids	Aridisols
Cellar	Loamy-Skeletal, Mixed, (Nonacid) Thermic	Lithic Torriorthents	Entisols
Cherioni	Loamy-Skeletal, Mixed, Hyperthermic, Shallow	Typic Durorthids	Aridisols
Cherum	Coarse-Loamy, Mixed, (Nonacid), Thermic	Typic Torriorthents	Entisols
Chuckawalla	Loamy-Skeletal, Mixed, Hyperthermic	Typic Haplargids	Aridisols
Cipriano	Loamy-Skeletal, Mixed, Hyperthermic, Shallow	Typic Durorthids	Aridisols
Contine	Fine, Mixed, Hyperthermic	Typic Haplargids	Aridisols
Continental	Fine, Mixed, Thermic	Typic Haplargids	Aridisols
Coolidge	Coarse-Loamy, Mixed, Hyperthermic	Typic Calciorthids	Aridisols
Oixaleta	Loamy-Skeletal, Mixed, (Calcareous) Thermic, Shallow	Typic Torriorthents	Entisols
Eba	Clayey-Skeletal, Mixed Thermic	Typic Haplargids	Aridisols
Ebon	Clayey-Skeletal, Mixed Thermic	Typic Haplargids	Aridisols
Estrella	Fine-Loamy, Mixed Calcareous) Hyperthermic	Typic Torrifluvents	Entisols
Faraway	Loamy-Skeletal, Mixed, Mesic	Lithic Haplustolls	Mollisols
Gachado	Loamy-Skeletal, Mixed, Hyperthermic	Lithic Haplargids	Aridisols
Gilman	Coarse-Loamy, Mixed, (Calcareous) Hyperthermic	Typic Torrifluvents	Entisols
Glendale	Fine-Silty, Mixed (Calcareous) Thermic	Typic Torrifluvents	Entisols
Gran	Clayey-Skeletal, Mixed, Hyperthermic	Typic Haplargids	Aridisols
Greyeagle	Loamy-Skeletal, Mixed, Thermic, Shallow	Typic Durorthids	Aridisols
Guest	Fine, Mixed (Calcareous) Thermic	Vertic Torrifluvents	Aridisols
Gunsight	Loamy-Skeletal, Mixed Hyperthermic	Typic Calciorthids	Aridisols
Harqua	Fine-Loamy, Mixed, Hyperthermic	Typic Haplargids	Aridisols
Hayhook	Coarse Loamy, Mixed (Nonacid), Thermic	Typic Torriorthents	Entisols
House Mountain	Loamy, Mixed, (Nonacid), Thermic	Lithic Torriorthents	Entisols
Laveen	Coarse-Loamy, Mixed, Hyperthermic	Typic Calciorthids	Aridisols
Lehmans	Clayey, Montmorillonitic, Thermic	Lithic Haplargids	Aridisols
Lomitas	Loamy-Skeletal, Mixed, Hyperthermic	Lithic Camborthids	Aridisols
Lonti	Fine, Mixed, Mesic	Ustollic Haplargids	Aridisols
Luzena	Clayey, Montmorillonitic, Mesic	Lithic Argiustolls	Mollisols
Lynx	Fine-Loamy, Mixed, Mesic	Cumulic Haplustolls	Mollisols
Moano	Loamy, Mixed, (Nonacid), Mesic	Lithic Torriorthents	Entisols
Mohall	Fine-Loamy, Mixed, Hyperthermic	Typic Haplargids	Aridisols
Mohave	Fine-Loamy, Mixed, Thermic	Typic, Haplargids	Aridisols
Momoli	Loamy-Skeletal, Mixed (Calcareous) Hyperthermic	Typic Torriorthents	Entisols
Pinaleno	Loamy-Skeletal, Mixed, Thermic	Typic Haplargids	Aridisols
Pinamt	Loamy-Skeletal, Mixed, Hyperthermic	Typic Haplargids	Aridisols
Poquette	Sandy-Skeletal, Mixed, Hyperthermic	Typic Torriorthents	Entisols
Quilitosa	Loamy-Skeletal, Mixed, (Calcareous) Hyperthermic	Lithic Torriorthents	Entisols
Rillito	Coarse-Loamy, Mixed, Hyperthermic	Typic Calciorthids	Aridisols
Springerville	Fine, Montmorillonitic, Mesic	Udic Chromusterts	Vertisols
Suncity	Loamy, Mixed, Hyperthermic Shallow	Typic Durorthids	Aridisols
Thunderbird	Fine, Montmorillonitic, Mesic	Aridic Argiustolls	Mollisols
Tremant	Fine-Loamy, Mixed, Hyperthermic	Typic Haplargids	Aridisols
Tres Hermanos	Fine-Loamy, Mixed, Thermic	Typic Haplargids	Aridisols
Venezia	Loamy, Mixed, Mesic	Lithic Haplustolls	Mollisols
Whitlock	Coarse-Loamy, Mixed, Thermic	Typic Calciorthids	Aridisols

APPENDIX 10
PHYSICAL AND CHEMICAL PROPERTIES OF SOIL ASSOCIATIONS

Soil Association[1]	% of EIS Area	Parent Material	Landform	% Slope	Dominant Soil Texture[3]	Depth to Bedrock or Rea. Layer (inches)	Range Sites[4]	Soil Moisture-Temp. Regimes[5]	Drainage	Hydrologic Soil Group[6]	Erosion Hazard[7]	Remarks[8]
1 House Mtn.-Lehmans-Rock Outcrop												
House Mtn. - 50%	3.9	Andesite-Rhyolite	Mountain Slopes	2-50	Sandy Loam	4-20	Volcanic, Limy Hills	Aridic-Thermic	Well	D	Slight	Steep Slopes, Shallow Soil Depth
Lehmans - 20%		Andesite-Rhyolite	Mountain Slopes	8-60	Gravelly Clay Loam	14-18	Volcanic Hills	Aridic-Thermic	Well		Slight	Steep Slopes, Shallow Soil Depth
Rock Outcrop - 15%												
Inclusions - 15% [2]												
2 Lomitas-Rock Outcrop												
Lomitas - 70%	3.8	Andesite-Rhyolite	Mountain Slopes	3-60	Very Gravelly Loam	12-20	Limy Hills Volcanic Hills	Aridic-Hyperthermic	Well	D	Slight	Shallow Soil Depth, Gravelly, Steep Slopes
Rock Outcrop - 15%												
Inclusions - 15% [2]												
3 Gunsight-Rillito-Cavelt												
Gunsight - 40%	6.2	Mixed Alluvium	Fan Terraces	0-15	Very Gravelly Sandy Loam	60	Limy Slopes/Limy Upland	Aridic-Hyperthermic	Well	B	Slight	Gravelly, High Lime
Rillito - 30%		Mixed Alluvium	Fan Terraces	0-15	Gravelly Sandy Loam	60	Limy Slopes/Limy Upland	Aridic-Hyperthermic	Well	B	Slight	High Lime, Gravelly
Cavelt - 15%		Mixed Alluvium	Fan Terracea	0-15	Gravelly Sandy Loam	4-20	Limy Slopes/Limy Upland	Aridic-Hyperthermic	Well	D	Slight	Shallow Soil Depth, High Lime
Inclusions - 15% [2]												
4 Cellar-Rock Outcrop												
Cellar - 65%	7.1	Granite	Mountain Slopes	3-60	Very Gravelly Sandy Loam	4-20	Shallow Upland Granitic Hills	Aridic-Thermic	Well	D	Slight	Shallow Soil Depth, Steep Slopes
Rock Outcrop - 20%												
Inclusions - 15% [2]												
5 Quilitoaa-Rock Outcrop												
Quilitosa - 55%	0.5	Granite	Mountain Slopes	5-55	Very Gravelly Sandy Loam	11-19	Limy Hills Granitic Hills	Aridic-Hyperthermic	Well	D	Slight	Stony, Shallow Soil Depth, Steep Slopes
Rock Outcrop - 30%												
Inclusions - 15% [2]												
6 Whitlock-Continental-Tres Hermanos												
Whitlock - 45%	2.9	Mixed Alluvium	Fan Terraces	0-15	Sandy Loam	60	Limy Slopes/Limy Upland	Aridic-Thermic	Well	B	Slight	Gravelly, Moderate Lime
Continental - 25%		Mixed Alluvium	Fan Terraces	2-10	Gravelly Clay	60	Loamy Hills	Aridic-Thermic	Well	C	Slight	Clayey, Shrink-Swell, Gravelly
Tres Hermanos - 15%		Mixed Alluvium	Fan Terraces	0-8	Gravelly Clay Loam	60	Limy Slopes	Aridic-Thermic	Well	B	Slight	Gravelly
Inclusions - 15% [2]												
7 Aco-Gunsight-Rillito												
Aco - 50%	3.1	Mixed Alluvium	Alluvial Fans	0-8	Sandy Loam	60	Limy Fans	Aridic-Thermic	Well	B	Slight	No Limitations
Gunsight - 20%		Mixed Alluvium	Fan Terraces	0-15	Very Gravelly Sandy Loam	60	Limy Slopes/Limy Upland	Aridic-Hyperthermic	Well	B	Slight	High Lime, Gravelly
Rillito - 15%		Mixed Alluvium	Fan Terraces	0-15	Gravelly Sandy Loam	60	Limy Slopes/Limy Upland	Aridic-Hyperthermic	Well	B	Slight	High Lime, Gravelly
Inclusions - 15% [2]												
8 Cherum-Hayhook-Glendale												
Cherum - 45%	2.0	Mixed Alluvium	Fan Terraces	1-5	Loam	60	Limy Fans/Loamy Upland	Aridic-Thermic	Well	B	Slight	No Limitations
Hayhook - 30%		Mixed Alluvium	Fan Terraces	1-5	Sandy Loam	60	Sandy Loam Upland	Aridic-Thermic	Well	B	Slight	No Limitations
Glendale - 15%		Mixed Alluvium	Alluvial Fans	0-5	Clay Loam	60	Loamy Bottom/Clay Bottom	Aridic-Thermic	Well	B	Moderate	Subject to Flooding
Incluaions - 10% [2]												
9 Chuckawalla-Gunsight												
Chuckawalla - 45%	2.8	Mixed Alluvium	Fan Terraces	0-5	Gravelly Silty Clay Loam	60	Saline/Limy Terraces	Aridic-Hyperthermic	Well	B	Slight	Desert Pavement, High Lime
Gunsight - 40%		Mixed Alluvium	Fan Terraces	0-15	Very Gravelly Sandy Loam	60	Limy Slopes/Limy Upland	Aridic-Hyperthermic	Well	B	Slight	High Lime, Gravelly
Inclusions - 15% [2]												
10 Aco-Momoli-Poquette												
Aco - 40%	2.8	Mixed Alluvium	Fan Terraces	0-8	Sandy Loam	60	Limy Fans	Aridic-Hyperthermic	Well	B	Slight	No Limitations
Momoli - 30%		Mixed Alluvium	Stream Terraces	0-8	Very Gravelly Sandy Loam	60	Sandy Loam Upland	Aridic-Hyperthermic	Well	B	Slight	Gravelly
Poquette - 20%		Mixed Alluvium	Fan Terraces	0-5	Gravelly Sandy Loam	60	Limy Fans/Sandy Loam Upland	Aridic-Hyperthermic	Excessively	B	Slight	Gravelly
Inclusions - 10% [2]												
11 Quilitosa-Cherioni-Gachado												
Quilitosa - 50%	7.7	Granite	Mountain Slopes	5-55	Very Gravelly Sandy Loam	11-19	Limy Hills/Granitic Hills	Aridic-Hyperthermic	Well	D	Slight	Steep Slopes, Shallow Soil Depth
Cherioni - 20%		Basalt	Mountain Slopes	0-70	Very Gravelly Fine Sandy Loam	5-20	Basalt Hills/Limy Uplands	Aridic-Hyperthermic	Well	D	Slight	Shallow Soil Depth, High Lime
Gachado - 20%		Andesite-Rhyolite	Mountain Slopes	0-40	Gravelly Sandy Clay Loam	9-20	Volcanic Hills	Aridic-Hyperthermic	Well	D	Slight	Steep Slopes, Shallow Soil Depth
Inclusions - 10% [2]												
12 Greyeagle-Continental-Cave												
Greyeagle - 45%	3.5	Mixed Alluvium	Fan Terraces	3-10	Gravelly Sandy Loam	8-14	Limy Upland	Aridic-Thermic	Excessively	D	Moderate	Shallow Soil Depth, High Lime
Continental - 25%		Mixed Alluvium	Fan Terraces	2-10	Gravelly Clay	60	Loamy Upland/Loamy Hills	Aridic-Thermic	Well	C	Slight	Clayey, Shrink-Swell, Gravelly
Cave - 15%		Mixed Alluvium	Fan Terraces	2-25	Gravelly Sandy Loam	4-20	Limy Upland/Limy Slopes	Aridic-Thermic	Well	D	Slight	Shallow Soil, High Lime, Gravelly
Inclusions - 15% [2]												
13 Eba-Pinaleno-Tres Hermanos												
Eba - 45%	0.5	Mixed Alluvium	Fan Terraces	3-45	Very Gravelly Clay	60	Loamy Hills/Loamy Upland	Aridic-Thermic	Well	C	Slight	Clayey, Gravelly
Pinaleno - 35%		Mixed Alluvium	Fan Terraces	0-20	Very Gravelly Sandy Clay Loam	60	Limy Slopes/Loamy Hills	Aridic-Thermic	Well	B	Slight	Gravelly, Moderate Lime
Tres Hermanos - 10%		Mixed Alluvium	Fan Terraces		Gravelly Clay Loam	60	Limy Slopes/Limy Fans	Aridic-Thermic	Well	B	Slight	Gravelly, Moderate Lime
Inclusions - 10% [2]												

APPENDIX 10 (Continued)
PHYSICAL AND CHEMICAL PROPERTIES OF SOIL ASSOCIATIONS

Soil Association[1]	% of EIS Area	Parent Material	Landform	% Slope	Dominant Soil Texture[3]	Depth to Bedrock or Res. Layer (inches)	Range Sites[4]	Soil Moisture-Temp. Regimes[5]	Drainage	Hydrologic Soil Group[6]	Erosion Hazard[7]	Remarks[8]
14 Lehmans-Dixaleta-Gran												
Lehmans - 30%	6.3	Andesite-Rhyolite	Mountain Slopes	8-60	Gravelly Clay Loam	14-18	Volcanic Hills	Aridic-Thermic	Well	D	Slight	Shallow Soil Depth, Steep Slopes
Dixaleta - 30%		Schist	Mountain Slopes	5-65	Extremely Channery Sandy Loam	20-60	Schist Hills/Limy Hills	Aridic-Thermic	Well	D	Slight	Shallow Soils, Steep Slopes
Gran - 30%		Granite	Mountain Slopes	0-60	Very Gravelly Sandy Clay	20-40	Shallow Upland/Granite Hills	Aridic-Thermic	Well	D	Slight	Steep Slopes, Gravelly
Inclusions - 10% [2]												
15 Ebon-Pinant-Tremant												
Ebon - 30%	1.7	Mixed Alluvium	Fan Terraces	0-40	Very Cobbly Clay	60	Loamy Upland/Loamy Hills	Aridic-Hyperthermic	Well	C	Slight	Clayey, Gravelley
Pinant - 20%		Mixed Alluvium	Fan Terraces	0-20	Very Gravelly Clay Loam	60	Limy Fans/Limy Slopes	Aridic-Hyperthermic	Well	B	Slight	Gravelly, Moderate Lime
Tremant - 15		Mixed Alluvium	Fan Terraces	0-5	Gravelly Clay Loam	60	Limy Fans-Slopes/Loamy Upland	Aridic-Hyperthermic	Well	B	Slight	Gravelly, Moderate Lime
Inclusions - 35% [2]												
16 Carefree-Suncity-Cipriano												
Carefree - 50%	0.7	Mixed Alluvium	Fan Terraces	0-10	Cobbly Clay	60	Clay Upland/Clay Loam Upland	Aridic-Hyperthermic	Well	B	Slight	Clayey, Cobbly, Shrink-Swell
Suncity - 25%		Mixed Alluvium	Fan Terraces	0-3	Gravelly Clay Loam	7-20	Limy Upland	Aridic-Hyperthermic	Well	D	Slight	Shallow Soil Depth, High Lime
Cipriano - 15%		Mixed Alluvium	Fan Terraces	0-15	Gravelly Loam	8-16	Limy Upland	Aridic-Hyperthermic	Well	D	Slight	Shallow Soil Depth, High Lime
Inclusions - 10% [2]												
17 Gunsight-Rillito-Tremant												
Gunsight - 50%	7.5	Mixed Alluvium	Fan Terraces	0-15	Very Gravelly Sandy Loam	60	Limy Slopes/Limy Upland	Aridic-Hyperthermic	Well	B	Slight	Gravelly, High Lime
Rillito - 30%		Mixed Alluvium	Fan Terraces	0-15	Gravelly Sandy Loam	60	Limy Slopes/Limy Upland	Aridic-Hyperthermic	Well	B	Slight	Gravelly, High Lime
Tremant - 10%		Mixed Alluvium	Fan Terraces	0-15	Gravelly Clay Loam	60	Limy Fans-Slopes/Loamy Upland	Aridic-Hyperthermic	Well	B	Slight	Gravelly, Moderate Lime
Inclusions - 10% [2]												
18 Casa Grande-Harqua												
Casa Grande - 30%	0.6	Mixed Alluvium	Basin Floor	0-2	Clay Loam	60	Saline Upland	Aridic-Hyperthermic	Well	C	Slight	Saline/Alkali
Harqua - 30%		Mixed Alluvium	Basin Floor	0-2	Gravelly Clay Loam	60	Saline Upland	Aridic-Hyperthermic	Well	C	Slight	Saline/Alkali
Inclusions - 40% [2]												
19 Gilman-Estrella-Avondale												
Gilman - 55%	0.3	Mixed Alluvium	Floodplains	0-3	Loam	60	Loamy Bottom	Aridic-Hyperthermic	Well	B	Slight	Flooding
Estrella - 10%		Mixed Alluvium	Alluvial Fans	0-3	Loam	60	Loamy Bottom	Aridic-Hyperthermic	Well	B	Slight	Flooding
Avondale - 10%		Mixed Alluvium	Alluvial Fans	0-3	Clay Loam	60	Loamy Bottom	Aridic-Hyperthermic	Well	B	Slight	Flooding
Inclusions - 25% [2]												
20 Laveen-Coolidge												
Laveen - 60%	0.1	Mixed Alluvium	Basin Floor	0-3	Loam	60	Limy Fans	Aridic-Hyperthermic	Well	B	Slight	High Lime
Coolidge - 20%		Mixed Alluvium	Fan Terraces	0-5	Sandy Loam	60	Limy Fans/Limy Upland	Aridic-Hyperthermic	Well	B	Slight	Gravelly, High Lime
Inclusions - 20%												
21 Brios-Carrizo												
Brios - 45%	0.7	Mixed Alluvium	Floodplains	0-3	Coarse Sand	60	Deep Sand/Sand Bottom	Aridic-Hyperthermic	Excessively	A	Moderate	Subject to Flooding
Carrizo - 30%		Mixed Alluvium	Floodplains/Alluvial Fans	0-3	Coarse Sand	60	Deep Sand/Sand Bottom	Aridic-Hyperthermic	Excessively	A	Moderate	Subject to Flooding
Inclusions - 25% [2]												
22 Contine-Mohall												
Contine - 60%	1.8	Mixed Alluvium	Fan Terraces	0-8	Clay	60	Loamy-Sandy Loam Upland	Aridic-Hyperthermic	Well	C	Slight	Clayey, Shrink-Swell
Mohall - 20%		Mixed Alluvium	Fan Terraces	0-8	Clay Loam	60	Loamy Bottom/Loamy-Sandy Loam Upland	Aridic-Hyperthermic	Well	B	Slight	No Limitations
Inclusions - 20% [2]												
23 Continental-Whitlock-Cave												
Continental - 30%	16.0	Mixed Alluvium	Fan Terraces	2-15	Gravelly Clay	60	Loamy Upland/Loamy Hills	Aridic-Thermic	Well	C	Slight	Shrink-Swell, Clayey, Gravelly
Whitlock - 25%		Mixed Alluvium	Fan Terraces	0-8	Sandy Loam	60	Limy Slopes	Aridic-Thermic	Well	B	Slight	Gravelly, Moderate Lime
Cave - 15%		Mixed Alluvium	Fan Terraces	3-25	Gravelly Sandy Loam	4-20	Limy Upland/Limy Slopes	Aridic-Thermic	Well	D	Slight	Shallow Soils, High Lime, Gravelly
Inclusions - 30% [2]												
24 Barkerville-Moano-Rock Outcrop												
Barkerville - 50%	5.9	Granite	Mountain Slopes	3-60	Very Gravelly Sandy Loam	20-40	Granitic Hills	Udic-Mesic	Well	C	Slight	Moderate Soil Depth, Gravelly, Steep Slop
Moano - 30%		Schist	Mountain Slopes	8-60	Gravelly Loam	6-20	Schist Hills	Ustic-Mesic	Well	D	Slight	Shallow Soil Depth, Steep Slopes
Rock Outcrop - 15%				5-60								
Inclusions - 5% [2]												
25 Luzena-Faraway-Rock Outcrop												Shallow Soil Depth, Shrink-Swell, Gravell
Luzena - 45%	0.4	Andesite-Rhyolite	Mountain Slopes	5-45	Gravelly Clay	4-20	Shallow Loamy/Volcanic Hills	Ustic-Mesic	Well	D	Moderate	Steep Slopes
Faraway - 35%		Andesite-Rhyolite	Mountain Slopes	5-45	Very Gravelly Sandy Loam	4-20	Shallow Loamy/Volcanic Hills	Ustic-Mesic	Well	D	Moderate	Shallow Soils, Gravelly, Steep Slopes
Rock Outcrop - 15%				15-60								
Inclusions - 5% [2]												
26 Cabezon-Thunderbird-Venezia												
Cabezon - 40%	0.6	Basalt	Mountain Slopes	8-25	Cobbly Clay	6-18	Shallow Loamy/Volcanic Hills	Ustic-Mesic	Well	D	Slight	Clayey, Shallow Soil Depth, Shrink-Swell
Thunderbird - 25%		Basalt	Mountain Slopes	2-15	Clay	20-40	Clay Loam Upland	Ustic-Mesic	Well	D	Moderate	Moderate Soil Depth, Clayey, Shrink-Swell
Venezia - 15%		Basalt	Mountain Slopes	5-40	Loam	6-18	Shallow Loamy/Volcanic Hills	Ustic-Mesic	Well	D	Moderate	Shallow Soil Depth, Steep Slopes
Inclusions - 20% [2]												

APPENDIX 10 (Continued)
PHYSICAL AND CHEMICAL PROPERTIES OF SOIL ASSOCIATIONS

Soil Association[1]	% of EIS Area	Parent Material	Landform	% Slope	Dominant Soil Texture[3]	Depth to Bedrock or Res. Layer (Inches)	Range Sites[4]	Soil Moisture-Temp. Regimes[5]	Drainage	Hydrologic Soil Group[6]	Erosion Hazard[7]	Remarks[8]
27 Springerville-Cabezon												
Springerville - 45%	2.5	Basalt	Fan Terraces, Basins	0-8	Silty Clay	40-60	Clay Upland	Ustic-Mesic	Well	D	Slight	Shrink-Swell, Clayey
Cabezon - 30%		Basalt	Mountain Slopes	8-25	Cobbly Clay	6-18	Shallow Loamy/Volcanic Hills	Ustic-Mesic	Well	D	Slight	Shallow Soil Depth, Shrink-Swell, Clayey
Inclusions - 25% [2]												
28 Lonti-Balon-Lynx												
Lonti - 70%	2.3	Mixed Alluvium	Upper Fan Terraces	0-30	Gravelly Clay	60	Loamy Hills/Loamy Upland	Ustic-Mesic	Well	C	Slight	Gravelly, Shrink-Swell
Balon - 15%		Mixed Alluvium	Upper Fan Terraces	2-25	Gravelly Clay Loam	60	Loamy Upland/Loamy Hills	Ustic-Mesic	Well	B	Slight	Gravelly
Lynx - 15		Mixed Alluvium	Floodplains/Alluvial Fans	0-8	Clay Loam	60	Loam Bottom	Ustic-Mesic	Well	D	Slight	Subject to Flooding
Inclusions - 0% [2]												
29 Continental-Mohave-Quest												
Continental - 45%	4.4	Mixed Alluvium	Fan Terraces	2-15	Gravelly Clay	60	Loamy Hills/Loamy Upland	Aridic-Thermic	Well	C	Slight	Clayey, Shrink-Swell, Gravelly No
Mohave - 20%		Mixed Alluvium	Fan Terraces	1-5	Clay Loam	60	Clay Loam Upland/Loamy Upland	Aridic-Thermic	Well	B	Slight	Limitations
Quest - 10%		Mixed Alluvium	Floodplains/Alluvial Fans	0-5	Clay	60	Sandy Loam Upland/Clay Bottom	Aridic-Thermic	Well	D	Slight	Subject to Flooding, Clayey
Inclusions - 25% [2]												
30 Hayhook-Eba-Pinaleno												
Hayhook - 50%	1.4	Mixed Alluvium	Fan Terraces	1-5	Sandy Loam	60	Sandy Loam Upland	Aridic-Thermic	Well	B	Slight	No Limitations
Eba - 30%		Mixed Alluvium	Fan Terraces	3-45	Very Gravelly Clay	60	Loamy Hills/Loamy Upland	Aridic-Thermic	Well	C	Slight	Clayey, Gravelly
Pinaleno - 20%		Mixed Alluvium	Fan Terraces	0-20	Very Gravelly Sandy Clay Loam	60	Limy Slopes/Loamy Hills	Aridic-Thermic	Well	B	Slight	Gravelly, Moderate Lime
Inclusions - 10% [2]												

SOURCE: U. S. Department of Agriculture, Soil Conservation Service, General Soil Map and Interpretations, Mohave County 1974; General Soil Map and Soil Interpretations, Yuma County, 1974; Soil Survey of Yavapai County, western part 1976; Soil Survey of Maricopa County, central part, 1977, unpublished Soil Survey of the Aquila-Carefree area, Maricopa County, 1981. Yuma and Mohave Soil Associations were updated during our 1979-80 SVIM Inventory.

[1] See Appendix 9 for official Soil Series Classification.
[2] Properties too variable to be estimated.
[3] General profile texture based on defined characteristics of the soil.
[4] Range site names, USDA, Soil Conservation Service.
[5] Soil Moisture Regimes (see Glossary).
[6] Hydrologic Soil Groups: A - Low runoff potential; B = Moderately low runoff potential; C = Moderately high runoff potential; D = High runoff potential.
[7] Erosion hazard is an estimate of the susceptibility or potential of a soil to erode.
[8] Remarks listed are those that have a major influence on soil use and management.

APPENDIX 11
DENSITY AND DISTRIBUTION OF CULTURAL RESOURCE SITES

Allotment	Total Federal Acres	Federal Acres Surveyed (Class II)	% Federal Land Surveyed (Class II)	No. of Sites Recorded (Class II)	Density Index*	Total No. Known Sites
Aguila	223,900	3,720	1.7	14	0.38	11
Alamo	32,200	600	1.9	0	--	7
Auza	10,000	0	0.0	0	--	0
Babcock	12,700	0	0.0	0	--	0
Bar D 4	16,000	280	1.8	1	0.36	13
Bialac	17,200	320	1.9	0	--	1
Bodfish	2,000	0	0.0	0	--	0
Brown, Buck	4,300	0	0.0	0	--	0
Cactus Garden	2,300	0	0.0	0	--	4
Cain	400	0	0.0	0	--	0
Calhoun	41,500	880	2.1	0	--	0
Carco	36,100	400	1.1	2	0.50	4
Carter	300	0	0.0	0	--	0
Carter Herrera	28,700	160	0.6	1	0.63	33
Central AZ	9,400	80	0.9	0	--	1
Coughlin "A"	17,900	0	0.0	0	--	3
Coughlin "B"	1,800	0	0.0	0	--	0
Cross Mountain	700	0	0.0	0	--	0
Date Creek	1,900	0	0.0	0	--	3
Desert Hills "A"	6,500	0	0.0	0	--	0
Desert Hills "B"	14,900	0	0.0	0	--	0
Douglas	35,200	160	0.5	1	0.63	2
Eagle Eye	3,800	0	0.0	0	--	0
Eagle Eye 6Y	3,500	40	1.1	0	--	4
Echeverria	15,400	80	0.5	4	5.0	0
Effus	15,000	120	0.8	1	0.83	0
Ekvall	2,800	0	0.0	0	--	0
Flat Iron	17,200	120	0.7	0	--	3
Foraker	1,000	0	0.0	0	--	0
Garcia	12,500	0	0.0	0	--	0
Globe	3,500	0	0.0	0	--	0
Gordon, R.	800	0	0.0	0	--	0
Grantham	1,400	0	0.0	0	--	0
Hancock	58,500	640	1.1	2	0.31	3
Harcuvar	100,200	960	1.0	3	0.31	3
Hassayampa	55,200	240	0.4	1	0.42	2
Hawkins	1,800	0	0.0	0	--	0
Heine	200	0	0.0	0	--	0
Hogue Produce	9,000	80	0.9	0	--	0
James, H.	500	0	0.0	0	--	0
Jenner	2,000	0	0.0	0	--	0
Jones	27,000	40	1.5	0	--	1
KMJ	1,400	0	0.0	0	--	0
Lamberson	23,900	80	0.3	0	--	0
Leidig	47,200	840	1.8	9	1.07	10
Loma Linda	34,900	400	1.1	5	1.25	4
Los Caballeros	13,400	240	1.8	0	--	0
Medd	4,600	0	0.0	0	--	1
Moralez	6,800	0	0.0	0	--	1
Narramore	12,900	40	0.3	0	--	1
Ohaco	54,400	800	1.5	15	1.88	1
Orosco	15,800	240	1.5	2	0.83	0
Palmerita	34,500	1,280	3.7	1	0.08	3
Park, H.	800	0	0.0	0	--	0
Park, R.	500	0	0.0	0	--	0
Park, R. & E.	1,400	0	0.0	0	--	0
Peters	100	0	0.0	0	--	0
Pipeline	30,900	240	0.8	4	1.67	4
Primrose	48,500	640	1.3	3	0.47	1
Rees	22,900	280	1.2	0	--	1
Ridgeway Kong	12,500	80	0.6	0	--	0
R. Santa Ynez	1,900	0	0.0	0	--	1
Saddle Mountain	10,200	80	0.8	1	1.25	6
Salome Community	10,600	240	2.3	1	0.42	0
Santa Maria	40,900	420	1.0	5	1.19	7
Satathite	100	0	0.0	0	--	0
Sitgreaves Red Hill	25,500	120	0.5	0	--	0
Sky Arrow	9,200	0	0.0	0	--	0
Sprouse	18,300	240	1.3	1	0.42	0
Thompson	1,200	0	0.0	0	--	0
Turner	10,800	80	0.7	1	1.25	64
Van Keuren	3,900	80	2.1	0	--	0
Vasilius	100	0	0.0	0	--	0
Wellik	2,000	40	2.0	0	--	0
Whitehead	2,900	0	0.0	0	--	0
White Tanks	18,200	720	4.0	3	0.42	10
Wickenburg "A"	16,200	0	0.0	0	--	0
Wickenburg "B"	2,700	0	0.0	0	--	0
Wilson	3,300	0	0.0	0	--	1

*Density Index = no. of sites ÷ no. acres surveyed x 100, based on BLM Class II inventory.

APPENDIX 12
CULTURAL RESOURCE SENSITIVITY BY ALLOTMENT

Allotment	Total Acres	Acres Sensitive Area	Index of Sensitivity*	Sensitivity Adjusted Rank	Sensitivity Raw Rank
Aguila	223,900	130,200	58.2	9	1
Alamo	32,200	4,500	14.0	26	18
Auza	10,000	0	0.0	--	--
Babcock	12,700	0	0.0	--	--
Bar D 4	16,000	10,900	68.1	7	9
Bialsc	17,200	3,700	21.5	20	23
Bodfish	2,000	0	0.0	--	--
Brown, Buck	4,300	4,300	100.0	1	19
Cactus Garden	2,300	100	4.3	35	41
Cain	400	400	100.0	1	39
Calhoun	41,500	7,700	18.6	22	15
Carco	36,100	3,500	9.7	32	24
Carter	300	0	0.0	--	--
Carter Herrera	28,700	8,300	28.9	14	14
Central AZ	9,400	0	0.0	--	--
Coughlin "A"	17,900	17,900	100.0	1	4
Coughlin "B"	1,800	0	0.0	--	--
Cross Mountain	700	0	0.0	--	--
Date Creek	1,900	1,600	84.2	4	30
Desert Hills "A"	6,500	0	0.0	--	--
Desert Hills "B"	14,900	0	0.0	--	--
Douglas	35,200	14,500	41.2	11	7
Esgle Eye	3,800	0	0.0	--	--
Eagle Eye 6Y	3,500	960	27.4	16	35
Echeverria	15,400	15,400	100.0	1	6
Effus	15,000	1,300	8.7	33	33
Ekvall	2,800	0	0.0	--	--
Flat Iron	17,200	6,400	37.2	13	16
Foraker	1,000	1,000	100.0	1	34
Garcia	12,500	0	0.0	--	--
Globe	3,500	0	0.0	--	--
Gordon, R.	800	600	75.0	5	37
Grantham	1,400	0	0.0	--	--
Hancock	58,500	7,700	13.1	27	15
Harcuvar	100,200	17,900	17.9	23	4
Hassayampa	55,200	11,500	20.8	21	8
Hawkins	1,800	1,800	100.0	1	29
Heine	200	0	0.0	--	--
Hogue Produce	9,000	1,600	17.8	24	31
James, H.	500	0	0.0	--	--
Jenner	2,000	2,000	100.0	1	27
Jones	27,000	0	0.0	--	--
KMJ	1,400	1,400	100.0	1	32
Lamberson	23,900	4,200	17.6	25	20
Leidig	47,200	10,200	21.6	19	10
Loma Linda	34,900	9,000	25.8	17	13
Los Caballeros	13,400	0	0.0	--	--
Medd	4,600	1,300	28.3	15	33
Moralez	6,800	4,200	61.8	8	20
Narramore	12,900	2,900	22.5	18	25
Ohaco	54,400	27,000	49.6	10	2
Orosco	15,800	1,300	8.2	34	33
Palmerita	34,500	400	1.2	37	39
Park, H.	800	800	100.0	1	36
Park, R.	500	500	100.0	1	38
Park, R. & E.	1,400	1,400	100.0	1	32
Peters	100	0	0.0	--	--
Pipeline	30,900	4,000	12.9	28	21
Primrose	48,500	5,000	10.3	31	17
Rees	22,900	2,900	12.7	29	25
Ridgeway Kong	12,500	1,300	10.4	30	33
R. Santa Ynez	1,900	1,900	100.0	1	28
Saddle Mountain	10,200	10,200	100.0	1	10
Salome Community	10,600	4,000	37.7	12	21
Santa Maria	40,900	0	0.0	--	--
Satathite	100	0	0.0	--	--
Sitgreaves Red Hill	25,500	4,500	17.6	25	18
Sky Arrow	9,200	9,200	100.0	1	12
Sprouse	18,300	15,500	84.7	3	5
Thompson	1,200	0	0.0	--	--
Turner	10,800	9,500	88.0	2	11
Van Keuren	3,900	3,900	100.0	1	22
Vasilius	100	0	0.0	--	--
Wellik	2,000	0	0.0	--	--
Whitehead	2,900	0	0.0	--	--
White Tanks	18,200	18,200	100.0	1	3
Wickenburg "A"	16,200	300	1.9	36	40
Wickenburg "B"	2,700	0	0.0	--	--
Wilson	3,300	2,300	69.7	6	26

*Index of Sensitivity = $\frac{\text{Sensitive Area}}{\text{Total Area}} \times 100$

APPENDIX 13
PROGRAMMATIC MEMORANDUM OF AGREEMENT BETWEEN THE DEPARTMENT OF THE INTERIOR, BUREAU OF LAND MANAGEMENT, THE THE ADVISORY COUNCIL ON HISTORIC PRESERVATION, AND THE NATIONAL CONFERENCE OF STATE HISTORIC PRESERVATION OFFICERS REGARDING THE LIVESTOCK GRAZING AND RANGE IMPROVEMENT PROGRAM

WHEREAS, the Department of the Interior, Bureau of Land Management, administers public lands, principally in the 11 Western States and Alaska, under concepts of multiple-use and sustained yield, and, among other responsibilities, the Bureau of Land Management is charged with management of rangeland and forage products under the Taylor Grazing Act of 1934 (43 U.S.C. 315) and the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701), which also charges the Bureau of Land Management with the management and protection of cultural resources; and

WHEREAS, Section 106 of the National Historic Preservation Act (16 U.S.C. 470f, as amended, 90 Stat. 1320 requires that the head of any Federal agency having direct or indirect jurisdiction over a proposed Federal, federally assisted, or federally licensed undertaking affecting properties in or eligible for the National Register of Historic Places shall afford the Advisory Council on Historic Preservation (hereafter Council) a reasonable opportunity for comment; and

WHEREAS, livestock grazing and range improvement activities undertaken by the Bureau of Land Management may have an effect upon properties in or eligible for the National Register of Historic Places and will require compliance with Section 106 of the National Historic Preservation Act, Section 2 of Executive Order 11593, May 13, 1971, "Protection and Enhancement of the Cultural Environment," and the Council's regulations, "Protection of Historic and Cultural Properties" (36 CFR Part 800); and

WHEREAS, the Bureau of Land Management is currently engaged in an ongoing program of rangeland management which involves the preparation, by 1988, of approximately 145 environmental statements on specific areas where grazing is permitted on approximately 174 million acres of public lands in the Western States and has requested Council review of the rangeland management program; and

WHEREAS, the Council and the Bureau of Land Management have met and reviewed the livestock grazing and range improvement program of the Bureau of Land Management and its relation to compliance with Section 106 of the National Historic Preservation Act of 1966 and Executive Order 11593, as implemented by the Council's regulations (36 CFR Part 800) and the responsibilities for historic and cultural resources under the National Environmental Policy Act of 1969 (42 U.S.C. 4321) as implemented by the Council on Environmental Quality in the "National Environmental Policy Act Regulations" (40 CFR Parts 1500-1508).

NOW, THEREFORE, it is mutually agreed that the Bureau of Land Management will ensure, through the stipulations outlined in this Programmatic Memorandum of Agreement, that historic and cultural properties will be given adequate consideration in grazing management program decisions and implementation which includes, but is not limited to, the preparation of grazing environmental statements, thereby meeting its responsibilities under Section 106 of the National Historic Preservation Act.

STIPULATIONS

1. The Bureau of Land Management will conduct Class I (existing data inventory) and Class II (sampling field inventory) inventories of historic and cultural properties, as specified in BLM Manual Section 8111, to be completed at the appropriate planning stage and prior to the preparation of the draft environmental statement. Inventory results will be evaluated, in consultation with the appropriate State Historic Preservation Officer, to identify properties included in or eligible for inclusion in the National Register of Historic Places.

   a. The inventory requirement may be modified on a case by case basis for interim grazing environmental statements (i.e., those prepared during fiscal years 1979 through 1981) if an alternative is acceptable to the appropriate State Historic Preservation Officer.

   b. If an acceptable alternative cannot be negotiated with the appropriate State Historic Preservation Officer, then the Bureau of Land Management will proceed with the preparation of the environmental statement and request the comments of the Council in accordance with 36 CFR 800. The Council's comments will be included in the final environmental statement.

2. This Programmatic Memorandum of Agreement and the inventory reports identifying historic and cultural properties will be referenced in each environmental statement.

3. Prior to commencement of any range improvement activities which involve land disturbance, the Bureau of Land Management will conduct a Class III inventory, as specified in the BLM Manual Section 8111.14, supplementing previous surveys to locate, identify, and evaluate properties in the impact area that may be eligible for inclusion in the National Register of Historic Places. Range improvement activities which involve land disturbance include, but are not limited to, such activities as construction of fencing and corrals, water development, chaining, and controlled burning. If properties that may be eligible for the National Register are found, the Bureau of Land Management will consult with the appropriate State Historic Preservation Officer and forward the documentation to the Keeper of the National Register to obtain a determination of eligibility in accordance with 36 CFR Part 1204.

4. The Bureau of Land Management will provide the appropriate State Historic Preservation Officer with copies of the reports of the Class I, II, and III inventories in accordance with Sections 102(a)(2) and 202(c)(9) of the Federal Land Policy and Management Act of 1976 for inclusion as part of the State Inventory conducted pursuant to 36 CFR Part 61.

5. The Bureau of Land Management will design the livestock grazing and range improvement program to avoid adverse effects on properties included in or eligible for inclusion in the National Register of Historic Places, unless this is not prudent or feasible.

6. Where it is not prudent or feasible to avoid adverse effects on properties included in or eligible for inclusion in the National Register of Historic Places as part of a livestock grazing and range improvement program authorization and the property is not a National Historic Landmark or National Historic Site, the Bureau of Land Management will consult with the appropriate State Historic Preservation Officer and will:
   a. Develop mutually acceptable measures to mitigate the impact of the proposed action; and

   b. Notify the Council in writing of agreements reached with the State Historic Preservation Officer under the provisions of 6(a) above. The Council need not be afforded further opportunity for review and comment.

7. The provisions of this Programmatic Memorandum of Agreement shall apply to the States of Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

8. If it is determined that the affected property is a National Historic Landmark or National Historic Site, or agreement cannot be reached between the Bureau of Land Management and the appropriate State Historic Preservation Officer on satisfactory mitigation measures, the Bureau of Land Management will request the comments of the Council in accordance with 36 CFR Part 800.

9. At the request of the President or a Member of Congress, the Council may advise the Bureau of Land Management, that a particular action, authorized by a grazing permit or lease, will require individual review and comment pursuant to 36 CFR Part 800. In that event, the Bureau of Land Management will comply with the provisions of the Council's regulations.

10. The Council and the Bureau of Land Management will review the provisions of this Agreement on an annual basis to determine whether modification or termination is appropriate. Should the current livestock grazing program of the Bureau of Land Management be revised, the ratifying parties will mutually determine whether the provisions of the Agreement will continue to apply.

Robert Utley 8/20/79
Deputy Executive Director, Advisory Council on Historic Preservation

Ed Hastey 12/21/79
Associate Director, Bureau of Land Management

Larry E. Tise 8/26/79
President, National Conference of State Historic Preservation Officers

Richard H. Jentette 1/14/80
Chairman, Advisory Council on Historic Preservation

APPENDIX 14
RANGELAND MANAGEMENT GUIDELINES FOR LANDS UNDER WILDERNESS REVIEW

1. General

In some respects, rangeland management activities are less restricted by the Interim Management Policy than other activities. This is partly because livestock grazing, at appropriate stocking levels, in itself, is compatible with maintaining wilderness suitability; it is partly because most grazing operations on the public lands qualify as grandfathered uses; and it is partly because some range improvements enhance wilderness values by better protecting the rangeland in a natural condition.

Some of the rangeland management activities involve a distinction between grazing uses that are "grandfathered" by section 603(c) of FLPMA and those that are not. The criteria for these two categories follow:

a. Grandfathered grazing use is that grazing authorized and used during the 1976 grazing fee year, including areas that were in the "rest" cycle of a grazing system.

b. Non-grandfathered grazing use is any grazing that was not authorized and used during the 1976 grazing fee year.

2. Grazing

a. Changes in Grazing. In both grandfathered and non-grandfathered grazing, changes in number and kind of livestock or period of use may be permitted, so long as (1) the changes do not cause declining condition or trend of the vegetation or soil, and (2) the changes do not cause unnecessary or undue degradation of the lands.

b. Prevention of Unnecessary or Undue Degradation. The grandfather clause does not freeze grandfathered grazing uses at the same level as existed on October 21, 1976. The mandate, in section 603(c), to prevent unnecessary or undue degradation of the lands explicitly applies to grandfathered uses. Thus, the grandfather provision will not prevent implementation of reductions in authorized use adopted in allotment management plans.

c. Grazing Systems. Grazing systems in operation during the 1976 grazing fee year may continue to be used and maintained; any new range improvements must satisfy the guidelines for range improvements in section 3, below. New grazing systems may be established as long as the new range improvements needed to implement the system are permissible under the guidelines in section 3.

d. Motor Vehicles. Motorized access on existing access routes may be permitted. Cross-country motorized access may be authorized along routes specified by the BLM if it satisfies the nonimpairment criteria, including reclamation requirements; no grading or blading will be permitted. Temporary roads may be built if the BLM has determined that they satisfy the nonimpairment criteria.

3. Range Improvements

This section sets forth the general criteria that will govern the use, maintenance, and installation of range improvements. The following section 4 shows how these criteria will affect certain specific types of improvements.

a. Pre-FLPMA Range Improvements. Range improvements existing or under construction on October 21, 1976, may continue to be used and maintained.

b. New, Grandfathered Range Improvements. In a grandfathered grazing operation, if a permit between the BLM and the grazing operator, issued before October 21, 1976, provided for installation by the operator of a series or system of improvements and part of that series or system had been installed before that date, the remaining improvements of the same kind may be installed.

c. New, Temporary Range Improvements. Temporary range improvements may be installed if they satisfy the nonimpairment criteria.

d. New, Permanent Range Improvements. New, permanent range improvements not permissible under (b) above may be approved for the purpose of enhancing wilderness values by better protecting the rangeland in a natural condition. In such cases they must meet all of the following criteria:

--they would not require motorized access if the area were designated as wilderness;

--the improvements are substantially unnoticeable in the wilderness study area (or inventory unit) as a whole;

--after any needed reclamation is complete, the area's wilderness values must not have been degraded so far, compared with the area's values for other purposes, as to significantly constrain the Secretary's recommendation with respect to the area's suitability or nonsuitability for preservation as wilderness.

For construction of approved range improvements, cross-country use of motor vehicles or construction of temporary access routes may be approved if BLM has determined that they satisfy the nonimpairment criteria.

4. Specific Guidelines for Range Improvements

a. Salting. In both grandfathered and non-grandfathered grazing operations, salting practices may be continued. New salting locations may be established to improve the distribution of grazing use so long as motorized access is on existing ways and trails or is cross-country access determined by the BLM to satisfy the nonimpairment criteria.

b. Supplemental Feeding. Supplemental feeding may be continued in grandfathered grazing operations if it was part of the operation in the 1976 grazing fee year. Otherwise, in both grandfathered and non-grandfathered grazing, supplemental feeding may be done in cases where BLM has determined that it satisfies the nonimpairment criteria and under emergency conditions, such as unexpected heavy snowfall.

c. Fences. In both grandfathered and non-grandfathered grazing, new, permanent fences may be built and maintained if the BLM determines that they are needed to better protect the rangeland in a natural condition. Barbed wire and wood or steel fence posts may be used; the fence will be designed to blend with the landscape and topography, and must meet the criteria in section 3 (d) above.

d. Water Developments. In both grandfathered and non-grandfathered grazing, new, permanent water developments will be limited as follows, and must meet the criteria in section 3 (d) above:

--Springs may be developed so long as the water trough blends into the surrounding landscape, and the pipeline area is put back to original contour, and plant cover restored as specified in the nonimpairment criteria.

--Reservoirs, pits, and charcos may be developed if they are designed and constructed to blend into the surrounding landscape. They should be no larger than necessary, and not to exceed 10 acre feet in storage capacity. Borrow areas for fills will be from the impoundment area or within the high-water area.

e. Vegetative Manipulation. This includes chemical, mechanical, and biological methods. In grandfathered grazing operations, if vegetative manipulation had been done on the allotment before October 21, 1976, and its impacts were noticeable to the average visitor on that date, the improvement may be maintained by applying the same treatment again on the land previously treated. Otherwise, vegetative manipulation may be used only for control of small areas of poisonous plants or in emergencies for control of insects and disease when there is no effective alternative. Limited exceptions are specified as follows:

--Prescribed burning may also be used where necessary to maintain fire-dependent natural ecosystems.

--Reseeding may also be done by hand or aerial methods to restore natural vegetation. (There is also a provision for reseeding in emergency rehabilitation projects, described in section G of this chapter.)

5. Wild Horse and Burro Management

Temporary facilities for management of wild horses and burros may be installed if they satisfy the nonimpairment criteria. The above guidelines for grazing practices and range improvements will also apply to wild horse and burro management, where appropriate.

Source: BLM, 1979b, p. 22-24.

APPENDIX 15
NONIMPAIRMENT CRITERIA FOR LANDS UNDER WILDERNESS REVIEW

Activities will be considered nonimpairing if the BLM determines that they meet each of the following criteria:

(a) Activities are temporary. This means that the use or activity may continue until the time when it must be terminated in order to meet the reclamation requirement of paragraphs (b) and (c) below. A temporary use that creates no new surface disturbance may continue unless Congress designates the area as wilderness, so long as it can easily and immediately be terminated at that time, if necessary to management of the area as wilderness.

(b) Any temporary impacts caused by the activity must, at a minimum, be capable of being reclaimed to a condition of being substantially unnoticeable in the wilderness study area (or inventory unit) as a whole by the time the Secretary of the Interior is scheduled to send his recommendations on that area to the President, and the operator will be required to reclaim the impacts to that standard by that date. If the wilderness study is postponed, the reclamation deadline will be extended accordingly. If the wilderness study is accelerated, the reclamation deadline will not be changed. A full schedule of wilderness studies will be developed by the Department upon completion of the intensive wilderness inventory. In the meantime, in areas not yet scheduled for wilderness study, the reclamation will be scheduled for completion within 4 years after approval of the activity. (Obviously, if and when the Interim Management Policy ceases to apply to an inventory unit dropped from wilderness review following a final wilderness inventory decision of the BLM State Director, the reclamation deadline previously specified will cease to apply.) The Secretary's schedule for transmitting his recommendations to the President will not be changed as a result of any unexpected inability to complete the reclamation by the specified date, and such inability will not constrain the Secretary's recommendation with respect to the area's suitability or nonsuitability for preservation as wilderness.

The reclamation will, to the extent practicable, be done while the activity is in progress. Reclamation will include the complete recontouring of all cuts and fills to blend with the natural topography, the replacement of topsoil, and the restoration of plant cover at least to the point where natural succession is occurring. Plant cover will be restored by means of reseeding or replanting, using species previously occurring in the area. If necessary, irrigation will be required. The reclamation will be complete, and the impacts will be substantially unnoticeable in the area as a whole, by the time the Secretary is scheduled to send his recommendations to the President.

(c) When the activity is terminated, and after any needed reclamation is complete, the area's wilderness values must not have been degraded so far, compared with the area's values for other purposes, as to significantly constrain the Secretary's recommendation with respect to the area's suitability or nonsuitability for preservation as wilderness. The wilderness values to be considered are those mentioned in section 2(c) of the Wilderness Act, including naturalness, outstanding opportunities for solitude or for primitive and unconfined recreation, and ecological, geological or other features of scientific, educational, scenic, or historical value.

Source: BLM, 1979b, p.18.

APPENDIX 16
REPRESENTATIVE RANCH INCOME STATEMENTS

Item	Small Short Term	Small Long Term	Medium Short Term	Medium Long Term	Large Short Term	Large Long Term
PROPOSED ACTION						
Revenue	$9,032	$11,200	$23,064	$31,588	$71,063	$103,740
Cash Costs	3,730	3,980	10,971	11,651	37,251	40,534
Net Revenue	$5,302	$ 7,220	$12,093	$19,937	$33,812	$ 63,206
Non-Cash Expenses						
Owner-Operator Labor	$1,317	$ 1,416	$ 3,790	$ 4,230	$12,000	$13,203
Depreciation	1,386	1,397	3,956	4,000	13,698	14,124
Total Non-Cash	$2,703	$ 2,813	$ 7,746	$ 8,230	$25,698	$27,327
Net Income	$2,599	$ 4,407	$ 4,347	$11,707	$ 8,114	$35,879
Herd Size (Cows)	48	52	129	144	460	506
NO ACTION						
Revenue	$9,032	$9,032	$23,064	$23,064	$71,063	$71,063
Cash Costs	3,730	3,730	10,971	10,971	37,251	37,251
Net Revenue	$5,302	$5,302	$12,093	$12,093	$33,812	$33,812
Non-Cash Expenses						
Owner-Operator Labor	$1,317	$ 1,317	$ 3,790	$ 3,790	$12,000	$12,000
Depreciation	1,386	1,386	3,956	3,956	13,698	$13,698
Total Non-Cash	$2,703	$ 2,703	$ 7,746	$ 7,746	$25,698	$25,698
Net Income	$2,599	$ 2,599	$ 4,347	$ 4,347	$ 8,114	$ 8,114
Herd Size (Cows)	48	48	129	129	460	460
INTENSIVE GRAZING						
Revenue	$9,032	$11,964	$23,064	$32,556	$71,063	$106,022
Cash Costs	3,730	4,207	10,971	12,382	37,251	41,328
Net Revenue	$5,302	$ 7,757	$12,093	$20,174	$33,812	$ 64,694
Non-Cash Expenses						
Owner-Operator Labor	$1,317	$ 1,512	$ 3,790	$ 4,347	$12,000	$ 13,494
Depreciation	1,386	1,407	3,956	4,013	13,698	14,228
Total Non-Cash	$2,703	$ 2,919	$ 7,746	$ 8,360	$25,698	$ 27,722
Net Income	$2,599	$ 4,838	$ 4,347	$11,814	$ 8,114	$ 36,972
Herd Size (Cows)	48	55	129	148	460	517
SEASONAL GRAZING*						
Revenue	$13,815	$15,146	$36,783	$39,280	$131,321	$143,138
Cash Costs	6,866	7,528	18,281	19,522	65,266	71,139
Net Revenue	$ 6,949	$ 7,618	$18,502	$19,758	$66,055	$ 71,999
Non-Cash Expenses						
Owner-Operator Labor	$ 526	$ 577	$ 1,401	$ 1,496	$ 5,002	$ 5,452
Depreciation	989	1,085	2,634	2,813	9,405	10,251
Total Non-Cash	$1,515	$ 1,662	$ 4,035	$ 4,309	$14,407	$ 15,703
Net Income	$5,433	$ 5,956	$14,467	$15,449	$51,648	$ 56,296
Herd Size (Yearlings)	83	91	221	236	789	860
NO LIVESTOCK						
Revenue	$1,410	$1,410	$6,235	$6,235	$12,083	$12,083
Cash Costs	888	888	3,996	3,996	8,416	8,416
Net Revenue	$ 522	$ 522	$2,239	$2,239	$ 3,667	$ 3,667
Non-Cash Expenses						
Owner-Operator Labor	$ 206	$ 206	$1,491	$1,491	$ 2,041	$ 2,041
Depreciation	1,264	$1,264	3,671	$3,671	10,154	10,154
Total Non-Cash	$1,470	$1,470	$5,162	$5,162	$12,195	$12,195
Net Income	-$ 948	-$ 948	-$2,923	$2,923	-$ 8,528	-$ 8,528
Herd Size (Cows)	7	7	35	35	78	78

* Estimates for this alternative apply to the allotments designated for seaaonal grazing under the ephemeral option. But the net revenue for the eight allotments designated for ephemeral grazing is undetermined.

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
AREA OFFICE, ARIZONA - NEW MEXICO
2953 W. INDIAN SCHOOL ROAD
PHOENIX, ARIZONA 85017

December 22, 1981

Mr. W. K. Barker, District Manager
Bureau of Land Management
Phoenix District Office
2929 W. Clarendon Avenue
Phoenix, AZ 85017

Dear Bill:

This letter is in response to your letter of December 9, 1981, which requested informal Section 7 consultation concerning the draft Lower Gila North Grazing Environmental Impact Statement (EIS).

The area covered by the EIS includes parts of Maricopa, Yuma, Yavapai, and Mohave counties. Approximately 2.7 million acres are in the planning area.

The draft EIS presents five alternative actions. These range from the proposed grazing management alternative which recommends actions designed to improve the present condition of key riparian areas, enhance critical wildlife habitats, and protect sensitive resources; to total elimination of all grazing on federal lands. Other alternatives considered are continuation of present grazing management (no action), intensive grazing management, and seasonal grazing.

Federally listed endangered or threatened species which are known to occur within the planning area include the bald eagle (Haliaeetus lencocephalus) and the peregrine falcon (Falco peregrinus). The bald eagle is found in the area only during the winter months. It feeds mainly upon fish and is therefore most often found along streams. The peregrine falcon is an occasional visitor to the area passing through during spring and fall migration. Several sites within the action area contain habitat which appears suitable for nesting peregrine falcons, however, no peregrines are known to nest within the area. Like the bald eagle, the peregrine also prefers the lush riparian habitat along permanent streams where their main prey, songbirds, are abundant.

No federally listed endangered or threatened plant species are in the planning area. However, four plant species currently under review by the U.S. Fish and Wildlife Service are found within the area. These four plant species are Mammillaria visidiflora, Opuntia wigginsii, Opuntia phaeacantha var-flavispina, and Peniocereus greggii.

Of the five alternatives, the proposed grazing management alternative would have a beneficial impact upon federally listed endangered or threatened species, including proposed plant species. Habitat needs of the bald eagle and peregrine falcon would be enhanced by the removal of 100 excess wild burros, planting broadleaf seedlings, and implementation of rotational grazing systems. Proposed endangered or threatened plant species would be protected because of fencing and reduced grazing in sensitive areas.

Thank you for the opportunity to review and comment upon the draft EIS and also for your interest in the welfare of endangered or threatened wildlife.

Sincerely,

Albert W. Jackson
Area Manager

cc: Regional Director (SE), USFWS, Albuquerque, NM
Ecological Services Field Office, USFWS, Phoenix, AZ

GLOSSARY, REFERENCES, AND INDEX

GLOSSARY, REFERENCES, AND INDEX

GLOSSARY

ABBREVIATIONS

The following abbreviations are used in this EIS. Those representing terms are defined in the glossary.

ACEC	area of critical environmental concern
AG&FD	Arizona Game and Fish Department
AMP	allotment management plan
AUM	animal unit month
BLM	Bureau of Land Management
EIS	environmental impact statement
FWS	Fish and Wildlife Service
HMA	herd management area
HMAP	herd management area plan
HMP	habitat management plan
MFP	management framework plan
PMOA	programmatic memorandum of agreement
ORV	off-road vehicle
SCS	Soil Conservation Service
SEP	social-economic profile
SHPO	State Historic Preservation Officer
SLD	Arizona State Land Department
SSF	soil surface factor
TDS	total dissolved solids
URA	unit resource analysis
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
VRM	visual resource management
WSA	wilderness study area

TERMS

ACCELERATED EROSION. Soil movement or loss exceeding normal geologic erosion, which is caused by human disturbances.

ACRE-FOOT. A volume that will cover an area of 1 acre to a depth of 1 foot (43,560 cubic feet).

ACTUAL USE. See Use (Grazing).

ALLOTMENT. An area where one or more operators graze their livestock. It generally consists of public lands but may include parcels of private and state-owned lands. The number of livestock and season of use are stipulated for each allotment. An allotment may consist of one or several pastures.

ALLOTMENT MANAGEMENT PLAN (AMP). A livestock grazing management plan dealing with a specific unit of rangeland, based on multiple-use resource management objectives. The AMP considers livestock grazing in relation to other uses of the range and in relation to renewable resources — watershed, vegetation, and wildlife. An AMP establishes the seasons of use, the number of livestock to be permitted on the range, and the rangeland developments needed.

ALLUVIAL. Pertaining to sediments transported and deposited by water.

ALLUVIAL FAN. A sloping, fan-shaped mass of sediment deposited by a stream where it emerges from an upland onto a plain.

ALLUVIAL SOIL. A soil formed from recently deposited alluvium and having essentially no horizon development nor modification of recently deposited materials.

ALLUVIUM. See Mixed Alluvium.

ANDESITE. A volcanic rock, made up primarily of plagioclase feldspar.

ANIMAL UNIT (AU). Considered to be one mature (1,000-pound) cow or the equivalent, based upon average daily forage consumption of 26 pounds dry matter per day (Range Term Glossary Committee, 1974).

ANIMAL UNIT MONTH (AUM). The amount of forage needed to sustain one cow or its equivalent for a period of 1 month.

ANNUAL PLANT. A plant that completes its life cycle and dies in 1 year or less (Range Term Glossary Committee, 1974).

AQUIFER. A water-bearing bed or layer of permeable rock, sand, or gravel, capable of yielding large amounts of water.

AREA OF CRITICAL ENVIRONMENTAL CONCERN (ACEC). Public land area where special management attention is needed to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife or natural systems or processes, or to protect life and safety from natural hazards.

ARIDIC MOISTURE REGIME. A soil moisture regime occuring in arid and in some semiarid climates, in which little leaching occurs in soils. Soluble salts thus accumulate if there is a source for salts. See Udic and Ustic Moisture Regimes.

ARIZONA NATURAL HERITAGE PROGRAM. A cooperative effort of the Nature Conservancy and the Arizona Game and Fish Department to maintain Arizona's biological diversity by collecting, analyzing, and disseminating information on the populations and distributions of plants and animals of special interest in the state. Being studied are Arizona species that are poorly understood and species with low populations or limited distribution within Arizona.

ASPECT (VEGETATION). The appearance that a dominant or most common species of vegetation gives to the viewer.

AUTHORIZED GRAZING PREFERENCE (QUALIFICATIONS). The total number of AUMs that livestock annually are allowed to graze on public lands. Preference is apportioned and attached to base waters or property owned or controlled by a permittee or lessee.

AVERAGE LICENSED USE (5 YEARS). Annual licensed use averaged over the past 5 years, representing a more realistic number of yearly AUMs consumed than just the past year's licensed use.

BASAL COVER. The area of ground surface covered by the stem or stems of a range plant, usually measured 1 inch above the soil, in contrast to the full spread of foliage.

BASALT. A fine-grained igneous rock dominated by dark colored minerals, consisting of over 50 percent plagioclase feldspars and the remainder ferromagnesian silicates.

BASIN FLOOR. A nearly level to gently sloping bottom surface of an intermontane basin, whose component landforms include playas, broad alluvial flats, and ephemeral drainageways.

BENEFIT-COST ANALYSIS. An analytical approach to solving problems of choice, which identifies for each objective the alternative yielding the greatest benefit for a given cost or the alternative producing the required level of benefits at the lowest cost.

GLOSSARY

BROWSE. The tender shoots, twigs, and leaves of trees, shrubs, and woody vines often used as food by cattle, deer, elk, and other animals; to consume browse.

BURRO HERD. One or more jacks (male burros) and their jennies (females).

BURRO HERD AREA. The area used by free-roaming burros during their yearly movements to obtain biological requirements. The area occupied by wild free-roaming burros at the passage of the Act of December 15, 1971 and limited to that area by the act, not to be expanded by relocating of animals.

BURRO USE AREA. An area currently being used by burros. See Burro Herd Area.

CALF CROP. The number of calves weaned from a given number of cows bred, usually expressed as a percentage (Range Term Glossary Committee, 1974).

CARRYING CAPACITY (GRAZING CAPACITY). The largest possible stocking rate without damaging vegetation or related resources. It may vary from year to year in the same area because of fluctuating forage production (Range Term Glossary Committee, 1974).

CHANNEL EROSION. Erosion occurring in the bottom of gullies that are more than 1 foot deep. See Upland Erosion.

CLIMAX. The highest ecological development of a plant community capable of perpetuation under the prevailing climate and soil conditions.

COBBLE. A generally rounded rock fragment between 3 and 10 inches in diameter.

COLIFORM. A group of bacteria normally present in the intestinal tracts of warm-blooded animals, which are used to reveal the sanitary quality of water.

COOPERATIVE AGREEMENT. An agreement issued by BLM for the construction of a rangeland development on public lands. Under a cooperative agreement, both BLM and the licensee have an interest in the project, but BLM retains its ownership. This agreement also spells out who will maintain the project.

COW-CALF LIVESTOCK OPERATION. A livestock operation in which a base breeding herd of mother cows and bulls is maintained. The cows produce a calf crop each year, and the operation keeps some heifer calves from each calf crop for breeding herd replacements. The operation sells the rest of the calf crop between the ages of 6 and 12 months along with old or nonproductive cows and bulls.

CRITICAL GROWTH PERIOD. The period in a plant's growth cycle when food reserves are lowest and grazing is most harmful.

CRITICAL WILDLIFE HABITAT. That part of the habitat of a *federally protected* wildlife species that is essential to its survival and perpetuation.

CROWN COVER (CANOPY). The vertical projection downward of the aerial portion of shrubs and trees.

CRUCIAL WILDLIFE HABITAT. That part of the habitat of a wildlife species that is essential to its survival and perpetuation as a population.

CULL COWS. Old and nonproductive cows and bulls removed from the breeding stock of a livestock operation. The percentage of cows culled is an indicator of performance. The lower the percentage, the more stable the operation.

CULL COW WEIGHT. Weight of a cow when removed from a livestock operation.

CULTURAL RESOURCE INVENTORY CLASSES:

Class I — library, archival, and literature research with consultation to identify known cultural resources.

Class II — a field inventory of an area, systematically designed to provide a predictive model of the nature and distribution of the cultural resources in the area.

Class III — an intensive field search of all surface-evident cultural resources for an entire area.

CULTURAL RESOURCE SITES. A physical location of past human activities or events. Sites vary in size, ranging from the location of a single cultural resource object to a cluster of cultural resource structures with associated objects and features.

CULTURAL RESOURCES. Those fragile and nonrenewable remains of human activity, occupation, or endeavor, reflected in districts, sites, structures, buildings, objects, artifacts, ruins, works of art, architecture, and natural features, which were of importance in human events. These resources consist of (1) physical remains, (2) areas where significant human events occurred — even though evidence of the event no longer remains, and (3) the environment immediately surrounding the actual resource.

CUSTODIAL GRAZING MANAGEMENT. A limited form of rangeland management employed when the percentage of public land is small, when public land is scheduled to be transferred from public ownership, or when other conditions are not conducive to intensive management. Under custodial management, an allottee is not required to follow a specified grazing system. BLM licenses custodial allotments only for the capacity of the public land but does not control overall livestock numbers.

ECONOMIC STUDY AREA. For the Lower Gila North EIS, the three-county area (Maricopa, Yavapai, and Yuma Counties, Arizona) in which most of the EIS area lies and whose economy would be most affected by the proposed grazing alternatives. The economic study area is used for analyzing impacts on regional economics.

ECOTONE. A transition line or strip of vegetation between two communities, having characteristics of both kinds of neighboring vegetation as well as characteristics of its own (Soil Conservation Society of America, 1970).

ENDANGERED ANIMAL SPECIES. Any animal species in danger of extinction throughout all or a significant portion of its range. This definition excludes species of insects that the Secretary of the Interior determines to be pests and whose protection under the Endangered Species Act of 1973 would present an overwhelming and overriding risk to man.

ENDANGERED PLANT SPECIES. Species of plants in danger of extinction throughout all or a significant portion of their ranges. Existence may be endangered because of the destruction, drastic change, or severe curtailment of habitat, or because of overexploitation, disease, predation, or unknown reasons. Plant taxa from very limited areas, e.g., the type localities only, or from restricted fragile habitats are usually considered endangered. See Threatened and Sensitive Plant Species.

ENVIRONMENT. The surrounding conditions, influences, or forces that affect or modify an organism or an ecological community and ultimately determine its form and survival.

ENVIRONMENTAL ASSESSMENT (EA). The procedure for analyzing the impacts of some proposed action on a given environment and the documentation of that analysis. An EA is similar to an environmental impact statement (EIS) except it is generally smaller in scope. An EA may be preliminary to an EIS.

ENVIRONMENTAL IMPACT STATEMENT (EIS). An analytical document developed for use be decisionmakers to weigh the environmental consequences of a potential decision. An EIS should accurately portray potential impacts on the human environment of a particular course of action and its possible alternatives.

EPHEMERAL ALLOTMENT. An allotment on which livestock grazing is permitted when sufficient precipitation and temperatures provide the *potential* for the growth of abundant annual (ephemeral) vegetation. See Perennial-Ephemeral Allotment.

EPHEMERAL RANGELAND. Rangeland that does not consistently produce forage but periodically provides annual vegetation suitable for livestock grazing.

GLOSSARY

EROSION. The wearing away of the land surface by wind, water, and other geological agents; the process by which soil particles are detached and removed by water or wind. See Accelcrated Erosion and Geological Erosion.

EXCLOSURE. A small area set aside and protected from grazing either to preserve representative areas in excellent range condition or to allow observation of succession on depleted rangeland without grazing (Rangeland Reference Area Committee, 1975).

EROSION CONDITION CLASSES. A classification system for soil erosion, which ranks a site on a scale of 0 to 100 in increments of 20 points. Value classes are as follows: 0-20 stable; 21-40 slight; 41-60 moderate; 61-80 critical; 81-100 severe.

EVAPOTRANSPIRATION. The loss of water by transpiration from plants and evaporation from the soil.

FAN TERRACE. A relict alluvial fan, no longer a site of active deposition, which is incised by younger and lower alluvial surfaces.

FEDERAL LAND POLICY AND MANAGEMENT ACT OF 1976 (FLPMA). Public Law 94-579, which gives BLM the legal authority to establish public land policy; to establish guidelines for administering such policy; and to provide for the management, protection, development, and enhancement of the public lands.

FORAGE. All browse and herbaceous foods available to grazing animals, which may be grazed or harvested for feeding (Range Term Glossary Committee, 1974).

FORAGE CARRYING CAPACITY. The number of animals an area's forage can support on a continuing basis without degrading resources.

FORB. An herbaceous plant that is not a grass, sedge, or rush (Soil Conservation Society of America, 1970).

GENEPOOL. The least number of animals in a population to provide enough genetic variation for the population to adapt to changing conditions and survive.

GEOLOGICAL EROSION. Erosion resulting from geological processes.

GRASSLAND. Land whose vegetation is dominated by grasses, grasslike plants, and forbs. For nonforest land to be classified as grassland, herbaceous vegetation must constitute at least 80 percent of the canopy cover excluding trees (Artz, 1980).

GRAVEL. Generally rounded rock fragments between 2 millimeters and 3 inches in diameter.

GRAZING PREFERENCE. See Authorized Grazing Preference.

GRAZING SYSTEM. A systematic application of grazing treatments to a management unit in a prescribed sequence over recurring periods of time; the manipulation of livestock to accomplish a desired result.

GROUND COVER (SOIL). Vegetation, litter, erosion pavement, and rocks covering the soil and providing protection from or resistance to the impact of raindrops. Ground cover is expressed as a percentage of the area covered.

HABITAT. A specific set of physical conditions that surround the single species, a group of species, or a large community. In wildlife management, the major components of habitat are considered to be food, water, cover, and living space.

HABITAT MANAGEMENT PLAN (HMP). A written and officially approved plan for a specific geographical area of public land that identifies wildlife habitat and related objectives, establishes the sequence of actions for achieving objectives, and outlines procedures for evaluating accomplishments.

HERBACEOUS. Pertaining to plants having little or no woody tissue.

HERBAGE. Herbaceous vegetation (as grass), especially when used for grazing.

HERD AREA. See Burro Herd Area.

HERD MANAGEMENT AREA PLAN (HMAP). Plan for the management of a geographic area used by wild horses or burros. A HMAP outlines details of a burro or horse capture plan, adoption program, and long-term management of populations.

INFILTRATION. The movement of water into soil through pores or other openings.

INITIAL STOCKING RATE. The livestock stocking level proposed by BLM and designed to reach a proper utilization of key forage species and to achieve other management objectives. The level is subject to change whenever utilization or other rangeland studies reveal that change is needed to meet the objectives. Initial stocking rates may or may not differ from stocking levels authorized before grazing management programs are implemented.

INTENSIVE GRAZING MANAGEMENT. A livestock management program that is based on the multiple-use resource management concept and that implements a specified grazing system formulated in an allotment management plan. As a rule, potental exists for improved rangeland or resource condition with a positive economic return on public investments.

INTRUSION (VISUAL RESOURCES). A feature (land, vegetation, or structure) that is generally considered out of context with the characteristic landscape.

KEY SPECIES. A plant that is relatively or potentially abundant, that is able to endure moderately close grazing, and that serves as an indicator of changes in a vegetational complex. The key species is an important vegetation component, which, if overused, will greatly affect watershed conditions, grazing capacity, or other resources. More than one key species may be selected on an allotment. One species may be important for watershed protection, and a different species may be important for livestock or wildlife forage or other values.

LESS INTENSIVE GRAZING MANAGEMENT. Management recommended for allotments where projected benefits to multiple resources are not high enough to justify the costs of an intensive grazing system. As a rule, present management and rangeland condition are satisfactory and no major resource conflicts exist. Under less intensive grazing management, BLM sets numbers and kind of livestock and period of use on all lands in the allotment.

LIME (LIMY). Chemically, lime is calcium oxide. As commonly used, however, lime also refers to calcium carbonate hydroxide. When present in visible amounts in the soil, lime is referred to as caliche.

LIMEPAN. A hardened layer of sandy or clayey soil cemented by calcium carbonate.

LITHIC SITE. A site containing debris left from the manufacture, use, or maintenance of flaked stone tools.

LITTER. A surface layer of loose organic debris consisting of freshly fallen or slightly decomposed organic materials (Soil Conservation Society of America, 1970).

LIVESTOCK OPERATOR. In this EIS, an individual, family, corporation, or other entity that runs a livestock operation. An operator may have a single allotment, more than one allotment, or a portion of an allotment.

LIVESTOCK PERFORMANCE. The efficiency of livestock within an operation, as measured by such indicators as calf crop, weaned calf weights, animal death rates, and cull cow weights.

LIVESTOCK PRODUCTION. The weight and number of animals that a particular range, pasture, or management system produces (Range Term Glossary Committee, 1974).

MAINTENANCE LEVEL. The least number of individuals of a population needed to maintain its existence. If a population drops below its maintenance level, it will die out.

GLOSSARY

MANAGEMENT FRAMEWORK PLAN (MFP). A land use plan for public lands that provides a set of goals, objectives, and constraints for a specific planning area to guide the development of detailed plans for the management of each resource.

MESA. A broad, nearly flat-topped and usually isolated upland mass.

METAMORPHIC ROCK. Rock whose structure or constitution has changed (often to a harder and more completely crystalline state) due to natural agencies, such as heat and pressure.

MIXED ALLUVIUM. Unconsolidated rock or soil material deposited by running water, including gravel, sand, silt, clay, and various mixtures of these.

MODIFIED FIRE SUPPRESSION. Any form of wildfire suppression other than full suppression. A modified fire suppression program considers resources being protected and costs of suppression in determining degrees of suppression to be applied.

MULTIPLE-USE MANAGEMENT. The management of the public land and its resources to allow their use in a combination to best meet the needs of the American people and ensure balanced and diverse resource use.

NATIONAL REGISTER OF HISTORIC PLACES. The official list, established by the Historic Preservation Act of 1966, of the Nation's cultural resources worthy of preservation. The Register lists archaeological, historic, and architectural properties (districts, sites, building, structures, and objects) nominated for their local, State, or national significance by state or federal agencies and approved by the National Register staff. The Register is maintained by the National Park Service of the Department of the Interior.

NONINTENSIVE GRAZING MANAGEMENT. Management recommended for allotments having low potential for improvement or negative economic returns on public investments. Special management actions are not feasible. Subcategories include custodial, ephemeral, and ungrazed allotments. Under nonintensive management, an allottee is not required to follow a specified grazing system, but BLM specifies livestock numbers, type of animal, and grazing season on public lands only.

OFF-ROAD VEHICLE (ORV). Any motorized vehicle designed for or capable of cross-country travel on or immediately over land, water, sand, snow, ice, marsh, swampland or other natural terrain, excluding (a) any registered motorboat, (b) any fire, military, emergency, or law enforcement vehicle when used for emergencies and any combat or combat support vehicle when used for national defense, and (c) any vehicle whose use is expressly authorized by the respective agency head under a permit, lease, license, or contract.

OPERATOR. See Livestock Operator.

PASTURE. A grazing area enclosed and separated from other areas by fences or natural barriers.

PERENNIAL-EPHEMERAL ALLOTMENT. An allotment on which livestock are permitted to graze perennial vegetation but on which additional livestock grazing may be authorized should sufficient annual (ephemeral) forage be present. See Ephemeral Allotment.

PERENNIAL PLANT. A plant that has a life cycle of 3 or more years (Range Term Glossary Committee, 1974).

PERENNIAL STREAM. A stream that flows throughout the year.

PHENOLOGY (PHENOLOGIES). The study of periodic biological phenomena, such as flowering or seeding, especially as related to climate (Range Term Glossary Committee, 1974).

PLANNING AREA ANALYSIS (PAA). A BLM planning document, analyzing social, economic, institutional, infrastructural, and environmental factors and establishing economic demand projections for a planning area. Data and analysis in PAAs are used for preparing management framework plans (MFPs).

PREFERENCE. See Authorized Grazing Preference.

PRESCRIBED BURNING. The intentional burning of the wildland fuels of a predetermined area under proper weather, fuel moisture, and soil moisture conditions to achieve planned benefits with little damage at acceptable costs.

PREY BASE. The kinds and numbers of animals a predator uses as food.

PUBLIC LAND. Federal lands administered by the Bureau of Land Management.

RANCH VALUE. The value of privately owned land combined with the value of the right to use AUMs on federal and state lands.

RANGELAND (RANGE). Land dominated by vegetation that can be grazed or browsed and whose husbandry is provided routinely through grazing management instead of renovation or cultural treatment.

RANGELAND CONDITION. The state of health of rangeland based on what it is naturally capable of producing.

RANGELAND DEVELOPMENT (RANGE IMPROVEMENT). A structure, development, or treatment used in concert with management (1) to rehabilitate, protect, and improve public land and its resources; (2) to arrest rangeland deterioration; and (3) to improve forage condition, fish and wildlife habitat, watershed protection, and livestock production, all consistent with land use plans.

RANGELAND PROGRAM SUMMARY. The document in which BLM officially announces its decision for a rangeland management program from among the alternatives analyzed in an EIS. The document discusses the other alternatives considered as well as the rationale for, projected benefits of, and implementation of the selected alternative.

RANGELAND SITE. A distinctive kind of rangeland, which because of soil, climate, topography, or other natural factors, differs from other kinds in its ability to produce a characteristic natural plant community. Rangeland sites are considered as units for purposes of discussion, investigation, and management.

REST. Any period during which no livestock grazing is allowed within a pasture.

RHYOLITE. A silica-rich fine-grained igneous rock of volcanic origin.

RIPARIAN. Situated on or pertaining to the bank of a river, stream, or other body of water. Riparian is normally used to refer to the plants of all types that grow along streams or around springs.

ROCK OUTCROP. Bedrock exposures or patches of thin soil over bedrock.

SALVAGE (ARCHAEOLOGICAL). The recovery of material and data from an affected resource before its alteration or destruction, through recordation, documentation, partial or total excavation, and collection for analysis and interpretation.

SCHIST. Any of various medium- to coarse-grained metamorphic rocks composed of laminated, often flaky, parallel layers of chiefly micaceous minerals.

SCOPING. An early and open process for determining the scope of issue to be addressed in an EIS and for identifying the significant issues related to a proposed action. Scoping may involve public meetings, field interviews with representatives of agencies and interest groups, discussions with resource specialists and managers, and written comments in response to news releases, direct mailings, and articles about the proposed action and scoping meetings.

SECONDARY SUCCESSION. See Succession.

SEDIMENT YIELD. The volume of soil moved from its point of origin to another point on the earth's surface.

SENSITIVE PLANT SPECIES. Plants whose populations are consistently small and widely dispersed, or whose ranges are restricted to a few localities, such that any appreciable reduction in numbers, habitat availability, or habitat condition might lead toward extinction. Sensitive

plants also include species rare in one locality (such as in Arizona) but abundant elsewhere. See Endangered and Threatened Plant Species.

SHRUB. A relatively low-growing, muchbranched, many-stemmed woody perennial plant.

SOCIAL-ECONOMIC PROFILE (SEP). An information document for use in BLM planning and decisionmaking. The SEP describes the social and economic characteristics of the human population and analyzes and records the economic, social, historical, and public coordination data for the social-economic profile area (SEPA).

SOCIOCULTURAL RESOURCES. Places, objects, structures, and things of importance to a subgroup or population at large. Included are values that reflect the concepts, religion, social heritage, habits, skills, arts, and lifestyles of a given people.

SOIL ASSOCIATION. A group of defined and named kinds of soils associated together in a characteristic geographic pattern.

SOIL MOISTURE. Water stored with the soil, which is available for plant uptake (transpiration) and evaporation to the atmosphere. Each soil has a characteristic capacity for holding moisture. When this capacity is reached, water cannot infiltrate the soil but instead runs off, increasing the probability of flooding.

SOIL MOISTURE REGIME. A soil condition referring to water available for plant growth during specific periods of the year. See Aridic, Udic, and Ustic Moisture Regimes.

SOIL PERMEABILITY. The characteristic of soil that enables water and air to move through it. The permeability of a soil may be limited by the presence of one nearly impermeable layer even though others are permeable.

SOIL SURFACE FACTOR (SSF). A numerical expression of surface erosion caused by wind and water as reflected by soil movement, surface litter, erosion, pavement, pedestalling, rills, flow patterns, and gullies. Values vary from zero for no erosion condition to 100 for a severe condition.

SOIL TEXTURE. The relative proportions of sand, silt, and clay particles in a mass of soil.

STATE HISTORIC PRESERVATION OFFICER (SHPO). The official within each state, authorized by the state at the request of the Secretary of the Interior, to act as a liaison for implementing the National Historic Preservation Act of 1966.

STEER OPERATION. A seasonal livestock operation in which a herd of weened steers and heifers are grazed from 3 to 9 months and then sold to feedlots or as breeding stock. Also called yearling operation.

STOCKING RATE (LEVEL). Number of grazing animals on a given area of land at any time. The stocking rate may be above, below, or equal to the proper carrying capacity and may be expressed as animal unit months (AUMs) per acre, animal unit years per section, or acres per AUM or animal unit years.

STONE. A rock fragment larger than 10 inches in diameter.

SUBCLIMAX. A stage in the ecological succession of a plant or animal community immediately before climax and often lasting due to the effects of fire or flood or other conditions.

SUCCESSION. An orderly process of biotic community development that involves changes in species, structure, and community processes with time. It is reasonably directional and therefore predictable. Secondary succession is this process occurring after disturbance.

SUSTAINED YIELD. Achieving and maintaining a permanently high level, annual or regular period production of the various renewable land resources without impairing the productivity of the land and its environmental values.

THREATENED ANIMAL SPECIES. Any animal species likely to become endangered within the foreseeable future throughout all or a significant part of its range. See Endangered Animal Species.

THREATENED PLANT SPECIES. Species of plants that are likely to become endangered within the foreseeable future throughout all or a significant portion of their ranges, including species categorized as rare, very rare, or depleted. See Endangered Plant Species and Sensitive Plant Species.

TOTAL DISSOLVED SOLIDS (TDS). Salt — an aggregate of carbonates, bicarbonates, chlorides, sulfates, phosphates, and nitrates of calcium, magnesium, mangenese, sodium, potassium, and other cations that form salts. High TDS solutions can change the chemical nature of water, exert varying degrees of osmotic pressures, and often become lethal to life in an aquatic environment.

TRAILING. Controlled directional movement of livestock. Natural trailing is the habit of livestock or wildlife repeatedly treading in the same line or path (Range Term Glossary Committee, 1974).

TRANSPIRATION. The release of water vapor from plants.

TRESPASS. The grazing of livestock on a range area without proper authority as a result of a willful or negligent act. Trespass includes the following: (1) grazing an excess number of livestock, (2) allowing livestock in the wrong areas, or (3) grazing livestock at an unauthorized time of year.

UDIC MOISTURE REGIME. The soil moisture regime common to the soils of humid climates that have well-distributed rainfall or have enough summer rain so that rainfall and stored moisture equals or exceeds evapotranspiration. See Aridic and Ustic Moisture Regimes.

UNIT RESOURCE ANALYSIS (URA). The system of data gathering and analysis that precedes land use planning for public lands and the resulting planning document.

UPLAND EROSION. Loss of soil from upland areas (topographically above stream channels and washes) as opposed to channel erosion.

UPLAND GAME. Game whose habitat is elevated above lowlands associated with rivers and valleys. The EIS area has three upland game birds: Gambel's quail, mourning dove, and white-winged dove.

USE (GRAZING). The consumption and destruction of forage by grazing animals or the amount of forage so consumed and destroyed. Use is usually expressed in animal unit months (AUMs) or animal units (AUs).

USTIC MOISTURE REGIME. A soil moisture regime intermediate between the Aridic and Udic regimes. Although the regime involves limited moisture, the moisture is present under conditions suitable for plant growth.

UTILIZATION (FORAGE). The proportion of current year's forage consumed or destroyed by grazing animals. Utilization is usually expressed by a percentage.

VECTOR. An organism that transmits a disease-causing fungus, virus, or bacterium.

VEGETATION TYPE. A plant community with distinguishable characteristics, described by the dominant vegetation present.

VIABILITY. The capability of a seed, spore, egg, or other organ of a plant or animal to continue to resume growth when it is exposed to favorable environmental conditions (Hanson, 1962).

VIGOR, PLANT. The relative well being and health of a plant as reflected by its ability to manufacture enough food for growth and maintenance. Vigor is reflected mainly by the size of a plant and its parts in relation to its age and environment.

VISITOR DAY. 12 visitor hours, which may be aggregated continuously, intermittently, or simultaneously by one or more people.

VISUAL RESOURCE MANAGEMENT (VRM) CLASSES. Classification containing specific objectives for maintaining or enhancing visual resources, including the kinds of structures and modifications acceptable to meet established visual goals.

GLOSSARY

WARM-SEASON PLANT. A plant whose growth period or major portion thereof occurs in spring, summer, and fall and that is usually dormant in the winter.

WILDERNESS. An uncultivated, uninhabited, and usually roadless area set aside for preservation of natural conditions. According to Section 2(c) of the Wilderness Act of 1964,

> A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

WILDERNESS STUDY AREA (WSA). A roadless area or island that has been inventoried and found to have wilderness characteristics as described in section 603 of the Federal Land Policy and Management Act and section 2(c) of the Wilderness Act of 1964.

WILD FREE-ROAMING BURROS. All unbranded and unclaimed burros and their progeny that have used public lands on or after December 15, 1971 or that use that lands as all or part of their habitat, not including burros that enetered or were introduced into public lands after December 15, 1971 by accident, negligence, or willful disregard of ownership.

WORKYEAR. An estimate of the work of one full-time employee for a 1-year period, regardless of the number of part-time employees who might actually do the work. A workyear comprises 2,600 hours.

YEARLING OPERATION. See Steer Operation.

YEARLONG GRAZING. Continuous grazing for a 12-month period or for a calendar year. As used in this EIS, yearlong grazing refers to grazing without a prescribed system.

REFERENCES

Almand, J. D., and Krohn, W. B. 1978. The position of the Bureau of Land Management on the protection and management of riparian ecosystems. In *Strategies for protection and management of floodplain wetlands and other riparian ecosystems*, p. 359-361. USDA Forest Service General Technical Report WO-12. Washington, D.C.

Andersen, James V. 1981. Range conservationist. BLM District Office, Phoenix, Arizona. Personal communication.

Anderson, B. W., Engel-Wilson, R. W., Wells, D., and Ohmart, R. D. 1977. Ecological study of southwestern riparian habitat: techniques and data adaptability. In *Importance, preservation, and management of riparian habitat: a symposium*, p. 146-155. USDA Forest Service General Technical Report RM-43. Fort Collins, Colorado: Rocky Mountain Forest and Range Experiment Station.

Arizona Crop and Livestock Reporting Service. 1981. *Arizona agriculatural statistics historical summary of county data 1965-1980.* Bulletin S-16. Phoenix.

Arizona Game and Fish Department. 1980. *Arizona big-game investigations 1978-1979*. Phoenix.

_____. 1981. Arizona hunting regulations, fall 1981-spring 1982. Phoenix.

Arizona Inter-agency Range Committee. 1972. *Proper use and management of grazing land*. Washington, D.C.: U.S. Government Printing Office.

Arizona Office of Economic Planning and Development. 1980. *Economic report of the Governor 1980*. Phoenix.

Artz, J. L. 1980. RISC Report. *Rangelands* 2(4): 165-167.

Baldwin, Tanna. 1981. Arizona State Parks Department, Phoenix. Personal communication.

Bell, H. M. 1973. *Rangeland management for livestock production*. Norman, Oklahoma: University of Oklahoma Press.

Berry, K. H. 1978. Livestock grazing and the desert tortoise. In *Transactions of the 43rd North American Wildlife and Natural Resources Conference*. Washington, D.C.: Wildlife Management Institute.

Berry, K. H., and Nicholson, L. 1979. The status of the desert tortoise in California: a threatened species. In *Desert Tortoise Council: proceedings of the 1979 symposium; March 24-26. Tucson, Arizona*. San Diego, California: Desert Tortoise Council.

Blaisdell, J., DeForge, J., Kelly, W., Weaver, R., and Welch, G. 1980. Desert bighorn habitat requirements and management recommendations. Death Valley, California: Desert Bighorn Council.

Branson, F. A., Gifford, G. F., and Owen, J. R. 1972. *Rangeland Hydrology*. Range Science Series No. 1. Denver, Colorado: Society for Range Management.

Brown, P. E., and Rice, G. E. 1978. Research design for the investigation of cultural resources along the Granite Reef Aqueduct and transmission lines — Central Arizona Project. Office of Cultural Resource Management, Department of Anthropology, Arizona State University, Tempe.

Bunch, T. D., Paul, S. R., and McCutchen, H. 1978. Chronic sinusitis in the desert bighorn *(Ovis canadensis nelsoni). Desert Bighorn Council Transactions* 22:16-20.

Bureau of Land Management. 1974-1975. Unpublished data from the watershed conservation and development inventory phase I, Harquvar, Skull Valley, and Vulture Planning Units. Phoenix, Arizona: BLM District files.

_____. 1978. Upper Gila-San Simon final grazing environmental statement. Phoenix, Arizona.

_____. 1979a. Lower Colorado social-economic profile (SEP). Phoenix, Arizona: BLM District office.

_____. 1979b. *Interim management policy and guidelines for lands under wilderness review*. Washington, D.C.

_____. 1979c. Shivwits proposed grazing management draft environmental impact statement. Phoenix, Arizona.

_____. 1979d. *Managing the public rangelands*. Public review draft. Washington, D.C.

_____. 1980a. Aquarius unit resource analysis (URA). Phoenix, Arizona: BLM District office.

_____. 1980b. Hualapai unit resource analysis (URA). Phoenix, Arizona: BLM District office.

_____. 1981a. Lower Gila North unit resource analysis (URA). Phoenix, Arizona: BLM District office.

_____. 1981b. Lower Gila North planning area analysis (PAA). Phoenix, Arizona: BLM District office.

_____. 1981c. Lower Gila North management framework plan (MFP). Phoenix, Arizona: BLM District office.

_____. 1981d. Hualapai-Aquarius draft grazing environmental impact statement. Phoenix, Arizona.

Busack, S. D., and Bury, R. B. 1974. Some effects of off-road vehicles and sheep grazing on lizard populations in the Mojave Desert. *Biological Conservation* 6(3):179-183.

Butterwick, Mary. 1981. Botonist, BLM District office, Phoenix, Arizona. Personal communication.

Buttery, R. F., and Shields, P. W. 1975. Range management practices and bird habitat values. In *Proceedings of the symposium on management of forest and range habitat for nongame birds*, ed. D. R. Smith, p. 183-189. USDA Forest Service, General Technical Report WO-1. Washington, D.C.

Cable, D. R. 1980. Seasonal patterns of soil water recharge and extraction on semidesert ranges. *Journal of Range Management* 33(1):9-15.

Call, M. 1978. Nesting habitats and surveying techniques for common western raptors. BLM Technical Note No. 316. Denver: Bureau of Land Management.

Clark, R. B. 1978. Pacific Southwest Inter-Agency Committee (PSIAC) methodology for estimating sediment yield on semiarid watersheds and relationship to Bureau inventory data base. Paper presented at BLM Nevada-Utah Watershed Workshop, November 27-December 1, 1978. Phoenix, Arizona: BLM District files.

Cottam, C. and Trefethen, J. B. (eds.) 1968. *Whitewings: the life history, status, and management of the white-winged dove*. Princeton, New Jersey: D. Van Nostrand Co.

Cultural Systems Research, Inc., 1978. *Persistence and power, a study of Native American peoples in the Sonoran Desert and the Devers-Palo Verde high voltage transmission line*. Report prepared for Southern California Edison Company. Menlo Park, California.

Dick-Peddie, S. 1976. Changes in grass cover and desert rodent fauna following habitat perturbation. *Journal of the Arizona Academy of Science* 11:23.

REFERENCES

Duff, D. A. 1978. Riparian habitat recovery on Big Creek, Rich County, Utah. In *Proceedings of the forum — grazing and riparian/stream ecosystems*, ed. O. B. Cope, p. 91-92. Denver, Colorado: Trout Unlimited.

Durfee, M. D. 1981. Area manager, Lower Gila Resource Area, BLM Phoenix District. Personal communication.

Elder, J. B. 1953. Utilization of man-made waterholes by wildlife in southern Arizona. M.S. thesis, University of Arizona, Tucson.

Farrell, J. E. 1973. Behavioral patterns of feral burros as influenced by seasonal changes in western Arizona. M.S. thesis. Arizona State University, Tempe.

Gallizioli, Steve. 1960. *About quail and quail hunting*. Phoenix: Arizona Game and Fish Department.

_____. 1977. Overgrazing on desert bighorn ranges. *Desert Bighorn Council Transactions*: 21-23.

Gifford, G. F., and Hawkins, R. H. 1978. Hydrologic impact of grazing — a critical review. *Water Resources Research* 14(2):305-313.

Gillmore, Howard. 1981. Maricopa County Parks and Recreation, Phoenix, Arizona. Personal communication.

Glocker, Carl. 1981. Soils correlator, Soil Conservation Service, Phoenix, Arizona. Personal communication.

Hall, R. S. 1980. Avifauna of the Hualapai and Aquarius Planning Units, Mohave and Yavapai Counties, Arizona. Unpublished report. Phoenix, Arizona: BLM District files.

Hanson, H. C. 1962. *Dictionary of Ecology*. New York: Bonanza Books.

Harriman, Richard. 1981. Soils correlator, Soil Conservation Service, Phoenix, Arizona. Personal communication.

Hawkes, M. M. 1978. Dietary analysis of cattle and deer in the Black Canyon Planning Unit. Unpublished data. Phoenix, Arizona: BLM District office.

Hawkes, M. M., and Furlow, R. C. 1978. Diet composition of mule deer and livestock in the Music and Aquarius Mountains, Arizona. *Transactions of the 1978 Arizona-New Mexico chapters of the Wildlife Society*, p. 178-197. Papers presented at Douglas, Arizona, February 2-4, 1978.

Heady, H. F. 1967. *Practices in range forage production* . St. Lucia, Brisbane, Australia: University of Queensland Press.

Helvie, J. B. 1971. Bighorns and fences. *Desert Bighorn Sheep Transactions* 15:53-62.

Hormay, A. L. 1970. *Principles of rest-rotation grazing and multiple-use land management*. U.S. Department of the Interior, BLM training text 4-(2200). Washington, D.C.: U.S. Government Printing Office.

Hughes, L. E. 1978. Rest-rotation grazing vs. season-long grazing on naval oil shale reserve allotments in Colorado. *Abstract of papers, 31st annual meeting Society for Range Management, San Antonio, Texas*. Denver, Colorado: Society for Range Management.

Humphrey, R. R. 1962. *Range ecology*. New York: Ronald Press.

Hutchins, S. S. 1954. Managing winter sheep range for greater profit. Farmers Bulletin No. 2067. Washington, D.C.: U.S. Department of Agriculture.

Jacoby, Harlan. 1981. Soil scientist, Soil Conservation Service, Phoenix, Arizona. Personal communication.

Jahn, L. R., and Trefethen, J. B. 1972. Placing channel modifications in perspective. In *Watersheds in transition*, proceedings of a symposium sponsored by the American Water Resources Association and Colorado State University, p. 15-21. Fort Collins, Colorado: Colorado State University.

Johnson, C. W., and Gebhardt. 1979. Sagebrush rangeland soil and sediment yield. Paper presented at the 34th Annual Meeting of the Pacific Northwest Region of the American Society of Agricultural Engineers, October 3-5, 1979, Boise, Idaho. Phoenix, Arizona: BLM District files.

Jones, K. B. 1980. Habitat selection and distribution status of *Eumeces gilberti* in western Arizona. Paper presented at the April 1980 meeting of the Southwestern Association of Naturalists, Las Cruces, New Mexico. Phoenix, Arizona: BLM District files.

_____. 1981. Distribution, ecology and habitat management of the reptiles and amphibians of the Hualapai and Aquarius Planning Units (northwest Arizona): an inventory and analysis by standard habitat site. Technical Note TN 353. Denver, Colorado: BLM Denver Service Center.

Jones, K. B., and Porzer, L. R. (in preparation). Distribution, ecology, and habitat management for reptiles and amphibians of the Lower Gila North Planning Area. Unpublished report. Phoenix, Arizona: BLM District office.

Kelly, W. A. 1960. Bighorn sheep management recommendations for the State of Arizona. *Desert Bighorn Sheep Transactions* 4:41-44.

Kepner, W. G. 1981. Aquatic inventory of the upper Bill Williams and Hassayampa drainages, Maricopa, Yavapai, and Yuma Counties. Technical Note TN 354. Denver, Colorado: BLM Denver Service Center.

Leithead, H. L. 1959. Runoff in relation to range condition in the Big Bend-Davis Mountain section of Texas. *Journal of Range Management* 12:83-87.

Leopold, Aldo. 1933. *Game management*. New York: Charles Scribner's Sons.

Lowe, C. H. 1964. *Arizona's natural environment: landscape and habitats*. Tucson: University of Arizona Press.

Lyford, F. P., and Qashu, H. K. 1969. Infiltration rates as affected by desert vegetation. *Water Resources Research* 5:1373-1376.

MacArthur, R. H., and MacArthur, J. W. 1961. On bird species diversity. *Ecology* 42:594-598.

Martin, S. C. 1979. Evaluating the impacts of cattle grazing on riparian habitats in the national forests of Arizona and New Mexico. In *Proceedings of the forum — grazing and riparian/stream ecosystems*, ed. O. B. Cope, p. 35-38. Denver, Colorado: Trout Unlimited, Inc.

McKnight, T. L. 1958. The feral burro in the United States: distribution and problems. *Journal of Wildlife Management* 22(2):163-179.

Millsap, B. A. 1981. Distributional status of falconiformes in westcentral Arizona with notes on ecology, reproductive success, and management. Technical Note TN 355. Denver, Colorado: BLM Denver Service Center.

Moore, E., Janes, E., Kinsinger, F., Pitney, K., and Sainsbury, J. 1979. *Livestock grazing management and water quality protection (state of the art reference document)*. Seattle, Washington: Environmental Protection Agency.

National Academy of Science National Research Council. 1980. *Wild and free roaming horses and burros current knowledge and recommended research*. Phase 1 Final Report. Washington, D.C. National Academy Press.

Ohmart, R. D. 1979. Associate Professor of Zoology, Arizona State University. Personal communication.

Ough, W. D., and Miller, R. C. 1980. Big Game Inventory of the Harquvar, Vulture, and Skull Valley Planning Units. Unpublished report prepared by the Arizona Game and Fish Department. Phoenix, Arizona: BLM District office.

REFERENCES

Pacific Southwest Inter-Agency Committee (PSIAC). 1968. *Report of the water management subcommittee on factors affecting sediment yield in the Pacific Southwest area and selection and evaluation of measures for reduction of erosion and sediment yield.* Sacramento, California: Pacific Southwest Region Planning Office, U.S. Department of the Interior.

Paulsen, H. A. 1975. *Range management in the central and southern Rocky Mountains.* USDA Forest Service research paper RM-154. Fort Collins, Colorado: Rocky Mountain Forest and Range Experiment Station.

Paulsen, H. A., and Ares, F. N. 1961. Trends in carrying capacity and vegetation on an arid southwestern range. *Journal of Range Management* 14(2):78-83.

Platts, W. S. 1979. Livestock grazing and riparian/stream ecosystems - an overview. In *Proceedings of the forum — grazing and riparian/stream ecosystems*, ed. O. B. Cope, p. 39-45. Denver, Colorado: Trout Unlimited, Inc.

Range Term Glossary Committee. 1974. *A glossary of terms used in range management.* Denver, Colorado: Society for Range Management.

Roney, John. 1977. Livestock and lithics: the effects of trampling. Unpublished manuscript. Phoenix: BLM District files.

Rouse, C. H. 1954. Antelope and sheep fences. Unpublished preliminary report of a study conducted by the Fish and Wildlife Service at the request of BLM. Phoenix, Arizona: BLM District files.

Russo, J. P. 1956. *The desert bighorn sheep in Arizona.* Phoenix: Arizona Game and Fish Department.

Schmutz, E. M., and Durfee, M. D. 1980. The next-best pasture deferred-rotation grazing system. Paper published by the Cooperative Extension Service, University of Arizona College of Agriculture. Tucson.

Schneider, P. B. 1981. A population analysis of the desert tortoise, *Gopherus agassizi*, in Arizona. Unpublished report. Phoenix, Arizona: BLM District office.

Sheppard, George. 1981. Wildlife biologist, BLM Arizona Strip District, St. George, Utah. Personal communication.

Sherrod, S. 1978. Diets of North American falconiformes. *Raptor Research* 12:49-121.

Shreve, F. 1942. The desert vegetation of North America. *Botanical Review* 8:195-246.

Soil Conservation Service. 1974a. General Soil Map of Mohave County, Arizona. Phoenix, Arizona.

_____. 1974b. General Soil Map of Yuma County, Arizona. Phoenix, Arizona.

_____. 1975a. *Soil taxonomy.* USDA Agriculture handbook No. 436. Washington, D.C.: U.S. Government Printing Office.

_____. 1975b. Selected soil features and interpretations for major soils of Arizona. Phoenix, Arizona.

_____. 1976a. *Soil survey, Yavapai County, Arizona.* Western part. Phoenix, Arizona.

_____. 1976b. *National range handbook.* Washington, D.C.: U.S. Government Printing Office.

_____. 1976c. Arizona universal soil loss equation. Technical Notes. Conservation Planning Note No. 11. Phoenix, Arizona.

_____. 1979. Range site guide for MLRA 30-1, 40-2, 40-3. Phoenix, Arizona: BLM District files.

_____. (in preparation). Aguila-Carefree soil survey. Phoenix, Arizona.

Soil Conservation Society of America. 1970. *Resource conservation glossary.* Ankeny, Iowa.

Stoddart, L. A., and Smith, A. D. 1955. *Range management.* 2nd ed. New York: McGraw-Hill.

Stoddart, L. A., Smith, A. D., and Box, T. W. 1975. *Range management.* 3rd ed. New York: McGraw-Hill.

Stone, C. L. 1977. An archaeological sample survey of the Alamo Reservoir — Mohave and Yuma Counties, Arizona. Office of Cultural Resource Management, Department of Anthropology, Arizona State University, Tempe.

Taylor, D. E., and Walchuck, S. L. 1980. Small mammal inventory and vegetative assessment of the Harcuvar, Vulture, and Skull Valley Planning Units. Unpublished report prepared by Arizona Game and Fish Department. Phoenix, Arizona: BLM District office.

Thomas, J. W., Maser, C., and Rodiek, J. E. 1978. Edges in managed rangelands — their interspersion, resulting diversity, and its measurement. In proposed publication *Wildlife habitats in managed rangelands — southeastern Oregon*, sponsored by BLM, USDA Forest Service Pacific Northwest Forest and Range Experiment Station, and Oregon Department of Fish and Wildlife. Phoenix, Arizona: BLM District files.

_____. 1979. Riparian zones in managed rangelands — their importance to wildlife. In *Proceedings of the forum — grazing and riparian/stream ecosystems*, ed. O. B. Cope, p. 21-30. Denver, Colorado: Trout Unlimited, Inc.

Trefethan, J. R. (ed.). 1975. *The wild sheep in modern North America.* New York: Winchester Press.

U.S. Department of Agriculture, Soil Survey Staff. 1951. *Soil survey manual.* Washington, D.C.

U.S. Department of Commerce. 1967. 2-year 6-hour precipitation, Arizona. Map prepared by the Special Studies Branch, Office of Hydrology, Weather Bureau, Environmental Science Services Administration. Washington, D.C.

Valley National Bank of Arizona. 1980. *Arizona statistical review.* 36th ed. Phoenix.

Van Poollen, H. W., and Lacey, J. R. 1979. Herbage response to grazing systems and stocking intensities. *Journal of Range Management* 32(4):250-253.

Wright, J. T. 1959. *Desert wildlife.* Arizona Game and Fish Department Wildlife Bulletin No. 6. Phoenix.

Yoakum, J. D. 1975. Antelope and livestock on rangelands. *Journal of Animal Science* 40(5):985-992.

_____. 1978. Pronghorn. In *Big game of North America: ecology and management*, ed. J. L. Schmidt and D. L. Gilbert, p. 103-121. Harrisburg, Pennsylvania: Stackpole Books.

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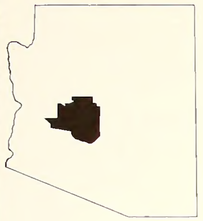
GLOSSARY

*U.S. GOVERNMENT PRINTING OFFICE: 1982-5843-328/1902,2818

PLATE 1



GRAZING ALLOTMENTS

3000 Aguila
3001 Alamo
3006 Babcock
3008 Bialac
3011 Cactus Garden
3012 Calhoun
3014 Carco
3015 Carter Herrera
3019 Coughlin (A)
3021 Cross Mtn.
3023 Date Creek
3025 Desert Hills (A)
3026 Douglas
3027 Eagle Eye
3029 Echeverria
3030 Effus
3031 Flat Iron
3038 Hancock
3040 Harcuvar
3041 Hassayampa
3045 Jones
3048 Lamberson
3050 Leidig
3051 Loma Linda
3052 Los Caballeros
3058 Narramore
3060 Ohaco
3061 Orosco
3063 Palmerita
3065 Peters
3066 Pipeline
3069 Primrose
3070 Rees
3071 Ridgeway Kong
3072 Saddle Mtn.
3073 Salome Comm.
3074 Santa Maria
3078 Sitgreaves Redhill
3079 Sky Arrow
3081 Sprouse
3084 Turner
3087 Wellik
3089 White Tanks
3090 Wickenburg (A)
3092 Wilson
3095 Garcia
5004 Thompson
5007 Bodfish
5008 Brown
5010 Carter
5012 Central Arizona
5014 R. Park
5015 J. Coughlin (B)
5017 Foraker
5018 Wickenburg (B)
5019 Globe
5020 Gorden
5021 Bar D 4
5022 Hawkins
5023 Heine
5025 Hogue Produce
5027 H. James
5028 Jenner
5029 Cain
5030 KMJ
5032 Auza
5033 Medd
5035 Moralez
5037 Harold Park
5039 R. Santa Ynez
5041 Ekvall
5042 Eagle Eye 6Y
5043 Satathite
5045 R. & E. Park
5046 Van Keuren
5047 Vasilius
5048 Whitehead
5049 Grantham
5016 Desert Hills (B)
3002 A Lazy T*
3017 Clem*
3022 Crowder Weiser*
3047 K Lazy B*
3057 Mumme*
3086 Ward*
3093 Muse*
5013 Cooper**

*These allotments extend into another planning area and will be addressed in the Lower Gila South RMP

**This allotment is not addressed in the Lower Gila North EIS, but will be addressed in the PHOENIX Resource Area RMP.

LEGEND

- PUBLIC LAND
- STATE LAND
- PRIVATE LAND
- Planning Unit Boundary
- EIS Extensions and deletions
- Allotment Boundaries
- DIVIDED HWY.
- BITUMINOUS OR CONCRETE
- BITUMINOUS SURFACE TREATED
- GRAVEL
- GRADED AND DRAINED
- UNIMPROVED
- CONNECTING ROADS
- ROUTE MARKERS: INTERSTATE, U.S. STATE, INDIAN, COUNTY
- MILEPOST
- NATIONAL FOREST
- INDIAN RESERVATION
- NATIONAL MONUMENT AND PARK
- LAND GRANT
- NOGALES — COUNTY SEAT
- PATAGONIA, Sonoita — INCORPORATED CITIES
- OTHER TOWNS OR VILLAGES
- AIRPORT: FACILITIES
- AIRPORT: NO FACILITIES

SCALE

5 0 5 10 15

STATUTE MILES

LOWER GILA NORTH PLANNING/EIS AREA

1980

U.S. Department of the Interior

Bureau of Land Management - Phoenix District

U.S. GOVERNMENT PRINTING OFFICE

Sources: Az. Dept. of Trans.
BLM Basemaps
Aerial Photography

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SECTIONIZED TOWNSHIP


U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT